

# ภาคผนวก ง

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ใบรับรองการสอบเทียบเครื่องมือ











ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม



เลขที่ใบ: HSP2212234

รายการ (No.)	รายการ (No.)	รายการ (No.)	รายการ (No.)
27 Sep 2022	รายการ (No.)	27 Sep 2022	รายการ (No.)
1. General		1. General	
2. การสอบเทียบ (Calibration)		2. การสอบเทียบ (Calibration)	
3. การสอบเทียบ (Calibration)		3. การสอบเทียบ (Calibration)	
4. การสอบเทียบ (Calibration)		4. การสอบเทียบ (Calibration)	
5. การสอบเทียบ (Calibration)		5. การสอบเทียบ (Calibration)	
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7. การสอบเทียบ (Calibration)		7. การสอบเทียบ (Calibration)	
8. การสอบเทียบ (Calibration)		8. การสอบเทียบ (Calibration)	
9. การสอบเทียบ (Calibration)		9. การสอบเทียบ (Calibration)	
10. การสอบเทียบ (Calibration)		10. การสอบเทียบ (Calibration)	
11. การสอบเทียบ (Calibration)		11. การสอบเทียบ (Calibration)	
12. การสอบเทียบ (Calibration)		12. การสอบเทียบ (Calibration)	
13. การสอบเทียบ (Calibration)		13. การสอบเทียบ (Calibration)	
14. การสอบเทียบ (Calibration)		14. การสอบเทียบ (Calibration)	
15. การสอบเทียบ (Calibration)		15. การสอบเทียบ (Calibration)	
16. การสอบเทียบ (Calibration)		16. การสอบเทียบ (Calibration)	
17. การสอบเทียบ (Calibration)		17. การสอบเทียบ (Calibration)	
18. การสอบเทียบ (Calibration)		18. การสอบเทียบ (Calibration)	
19. การสอบเทียบ (Calibration)		19. การสอบเทียบ (Calibration)	
20. การสอบเทียบ (Calibration)		20. การสอบเทียบ (Calibration)	

Mr. Chaitan Pongthong  
Service Engineer

Delivering Growth - In Asia and Beyond.

CAL/PA/01-01: 30 Jul 2022

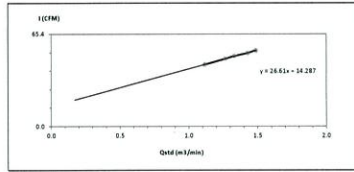


High Volume Air Sampler Calibration Worksheet

Project Site: Amata B. Green Power (Rayong) 4 Limited  
 Calibrate Location: Rayong  
 Calibrate Date: 15-Nov-22  
 Calibration Sheet No.: C-151122-RYG-F30193  
 Calibrator ID: RYG-F30193  
 Calibrator S/N: TS-50284  
 Calibration S/N: 1166

Barometric Pressure (mm Hg): 757  
 Temperature (°C): 30  
 High Volume ID: RYG-F30193  
 High Volume Model: TS-51100  
 High Volume S/N: 4799  
 Calibrator Slope: 1.5765  
 Calibrator Intercept: -0.0243

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m³/min)	1-Chart (CFM)	Linear Regression
1	2.8	1.1319	44	Slope: 25.015
2	3.6	1.2660	48	Intercept: 14.270
3	4.0	1.3334	50	Correlation Coefficient: 0.9907
4	4.6	1.4288	52	
5	5.0	1.4804	54	



Calibrated by: [Signature]  
 (Mr. Nontakul Tippakump)  
 Field Scientist(1)

Approved by: [Signature]  
 (Mr. Nongpong Jantapong)  
 Extra Field Coordinator Scientist (1)

FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/01/14

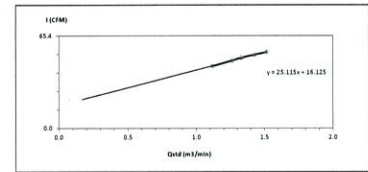


High Volume Air Sampler Calibration Worksheet

Project Site: Amata B. Green Power (Rayong) 4 Limited  
 Calibrate Location: Rayong  
 Calibrate Date: 15-Nov-22  
 Calibration Sheet No.: C-151122-RYG-F30193  
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Barometric Pressure (mm Hg): 757  
 Temperature (°C): 30  
 High Volume ID: RYG-F30193  
 High Volume Model: TS-51100  
 High Volume S/N: 4799  
 Calibrator Slope: 1.5765  
 Calibrator Intercept: -0.0243

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m³/min)	1-Chart (CFM)	Linear Regression
1	2.8	1.1319	44	Slope: 25.1153
2	3.6	1.2660	48	Intercept: 16.1272
3	4.0	1.3334	50	Correlation Coefficient: 0.9970
4	4.6	1.4288	52	
5	5.2	1.5179	54	



Calibrated by: [Signature]  
 (Mr. Nontakul Tippakump)  
 Field Scientist(1)

Approved by: [Signature]  
 (Mr. Nongpong Jantapong)  
 Extra Field Coordinator Scientist (1)

FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/01/14

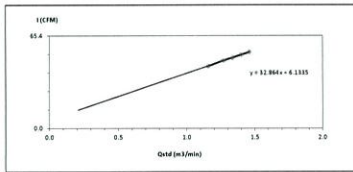


High Volume Air Sampler Calibration Worksheet

Project Site: Amata B. Green Power (Rayong) 4 Limited  
 Calibrate Location: Rayong  
 Calibrate Date: 15-Nov-22  
 Calibration Sheet No.: C-151122-RYG-F30193  
 Calibrator ID: RYG-F30193  
 Calibrator S/N: TS-50284  
 Calibration S/N: 1166

Barometric Pressure (mm Hg): 757  
 Temperature (°C): 30  
 High Volume ID: RYG-F30193  
 High Volume Model: TS-51100  
 High Volume S/N: 4799  
 Calibrator Slope: 1.5765  
 Calibrator Intercept: -0.0243

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m³/min)	1-Chart (CFM)	Linear Regression
1	3.0	1.1375	44	Slope: 32.8039
2	3.6	1.2660	48	Intercept: 6.1135
3	4.0	1.3334	50	Correlation Coefficient: 0.9991
4	4.4	1.3975	52	
5	4.8	1.4587	54	



Calibrated by: [Signature]  
 (Mr. Nontakul Tippakump)  
 Field Scientist(1)

Approved by: [Signature]  
 (Mr. Nongpong Jantapong)  
 Extra Field Coordinator Scientist (1)

FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/01/14

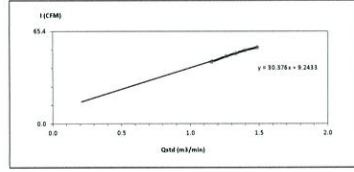


High Volume Air Sampler Calibration Worksheet

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 Calibrate Date: 15-Nov-22  
 Calibration Sheet No.: C-151122-RYG-F30193  
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Barometric Pressure (mm Hg): 757  
 Temperature (°C): 30  
 High Volume ID: RYG-F30193  
 High Volume Model: TS-51100  
 High Volume S/N: 4799  
 Calibrator Slope: 1.5765  
 Calibrator Intercept: -0.0243

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m³/min)	1-Chart (CFM)	Linear Regression
1	3.0	1.1375	44	Slope: 30.3764
2	3.6	1.2660	48	Intercept: 9.4113
3	4.0	1.3334	50	Correlation Coefficient: 0.9940
4	4.4	1.3975	52	
5	5.0	1.4804	54	



Calibrated by: [Signature]  
 (Mr. Nontakul Tippakump)  
 Field Scientist(1)

Approved by: [Signature]  
 (Mr. Nongpong Jantapong)  
 Extra Field Coordinator Scientist (1)

FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/01/14



RYG, EN0001

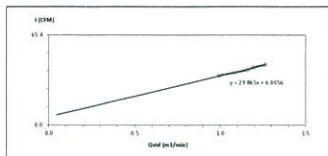
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297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 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1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425



# High Volume Air Sampler Calibration Worksheet

Project Site: Amara B. Green Power (Boring) Barometric Pressure (mm Hg): 757  
 Calibration Location: 4 Limited Temperature (°C): 30  
 Calibration Date: 15-Jun-22 High Volume ID: RYG\_P50189  
 Calibration Unit: C-151122-876-F0189 High Volume Model: TE-10000  
 Calibration ID#: RYG\_P50189 High Volume SN: 15010  
 Calibration Model: TE-10000 Calibration Slope: 1.0745  
 Calibration SN: 1104 Calibration Intercept: -0.0243

Test No.	Inlet H <sub>2</sub> O (inch)	Flow (m <sup>3</sup> /min)	1 Chart (CFM)	Linear Regression
1	2.2	0.9942	36	Slope: 26.8645
2	2.4	1.0790	38	Intercept: 6.8054
3	3.0	1.1771	40	Correlation Coefficient: 0.9924
4	3.2	1.1949	42	
5	3.4	1.2600	44	



Calibrated by: [Signature] Approved by: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Scientist(1) Entire Field Coordinator/Inspector(1)

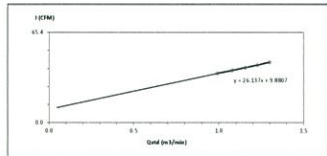
FORM NO. F-04-074 REVISION NO. ISSUE DATE: 14/03/14



# High Volume Air Sampler Calibration Worksheet

Project Site: Amara B. Green Power (Boring) Barometric Pressure (mm Hg): 757  
 Calibration Location: 4 Limited Temperature (°C): 30  
 Calibration Date: 15-Jun-22 High Volume ID: RYG\_P50189  
 Calibration Unit: C-151122-876-F0189 High Volume Model: TE-10000  
 Calibration ID#: RYG\_P50189 High Volume SN: 15010  
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Test No.	Inlet H <sub>2</sub> O (inch)	Flow (m <sup>3</sup> /min)	1 Chart (CFM)	Linear Regression
1	2.2	0.9942	36	Slope: 26.1175
2	2.4	1.0790	38	Intercept: 9.8807
3	3.0	1.1771	40	Correlation Coefficient: 0.9992
4	3.4	1.2099	42	
5	3.8	1.3002	44	



Calibrated by: [Signature] Approved by: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Scientist(1) Entire Field Coordinator/Inspector(1)

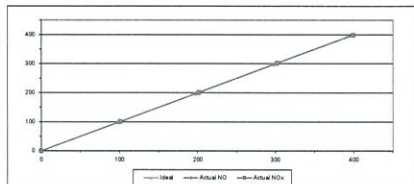
FORM NO. F-04-074 REVISION NO. ISSUE DATE: 14/03/14



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NQV Analyzer  
 Manufacturer: Teledyne API Model: T200  
 Serial No.: 2168 Equipment ID: RYG\_P80282  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.88 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-20 Expired Date: 8-Feb-30

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.80	-1.20	-1.20	101.00	1.00	1.00
2	200.00	198.50	-1.50	-1.50	201.50	1.50	0.85
3	300.00	298.10	-1.90	-0.63	302.30	2.30	0.77
4	400.00	398.20	-1.80	-0.45	398.90	-1.20	-0.30
AVERAGE (%)				-0.84			0.44



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

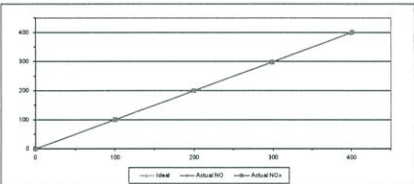
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NQV Analyzer  
 Manufacturer: HORIBA Model: APHA-375  
 Serial No.: T21EYVLL Equipment ID: RYG\_P80487  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.88 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70	100.20	0.20	0.20
2	200.00	198.40	-1.60	-0.80	199.60	-0.40	-0.20
3	300.00	297.10	-2.90	-0.97	298.50	-1.50	-0.50
4	400.00	398.60	-1.40	-0.35	400.70	0.70	0.17
AVERAGE (%)				-0.74			-0.08



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

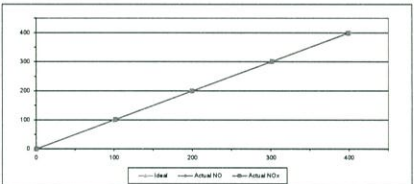
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NQV Analyzer  
 Manufacturer: HORIBA Model: APHA-375  
 Serial No.: NYDERVH Equipment ID: RYG\_P80488  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.88 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50	101.80	1.80	1.80
2	200.00	198.70	-1.30	-0.65	199.70	-0.30	-0.15
3	300.00	301.10	1.10	0.37	301.60	1.60	0.50
4	400.00	401.30	1.30	0.33	398.90	-1.10	-0.28
AVERAGE (%)				-0.08			0.38



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

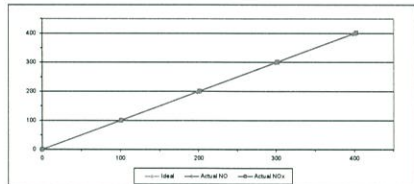
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NQV Analyzer  
 Manufacturer: Teledyne API Model: T200  
 Serial No.: 7238 Equipment ID: RYG\_P80588  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.88 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.00	1.00	1.00
2	200.00	198.30	-1.70	-0.85	201.00	1.00	0.50
3	300.00	298.80	-1.20	-0.40	301.50	1.50	0.50
4	400.00	398.20	-1.80	-0.45	402.50	2.50	0.63
AVERAGE (%)				-0.40			0.58



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

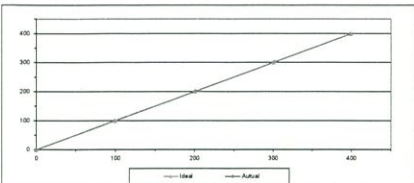
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: SO2 Analyzer  
 Manufacturer: HORIBA Model: APHA-375  
 Serial No.: PAUYSTA Equipment ID: RYG\_P80488  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.3 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.80	-1.20	-1.20
2	200.00	201.10	1.10	0.55
3	300.00	302.30	2.30	0.77
4	400.00	398.00	-2.00	-0.50
AVERAGE (%)				-0.01



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

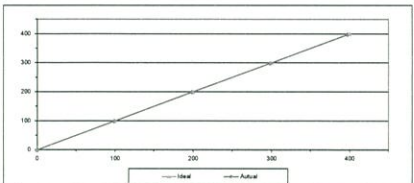
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: SO2 Analyzer  
 Manufacturer: Teledyne API Model: T100  
 Serial No.: 8081 Equipment ID: RYG\_P80584  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.3 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.80	-1.20	-1.20
2	200.00	198.70	-1.30	-0.65
3	300.00	298.30	-1.70	-0.57
4	400.00	397.30	-2.70	-0.67
AVERAGE (%)				-0.60



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

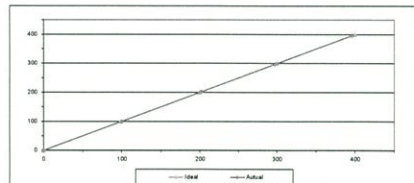
ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: SO2 Analyzer  
 Manufacturer: Teledyne API Model: T100  
 Serial No.: 1778 Equipment ID: RYG\_P80581  
 Calibrator Manufacturer: Teledyne API Model: 700  
 Serial No.: 847  
 Std. Gas Concentration (PPM): 88.3 Cylinder No.: ON0027222  
 Cylinder Pressure (ps): 1800 Certified By: Algeas Inc.  
 Certified Date: 8-Feb-22 Expired Date: 8-Feb-30

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40
2	200.00	201.80	1.80	0.90
3	300.00	297.20	-2.80	-0.93
4	400.00	396.00	-4.00	-1.00
AVERAGE (%)				-0.37



Calibrated By: [Signature] Approved By: [Signature]  
 (Mr. Jirawut Salsam) (Mr. Jirawut Salsam)  
 Field Environmental Scientist(1) Assistant General Manager

ALS Laboratory Group  
 FORM NO. F-06-006 REVISION NO. ISSUE DATE: 03/04/12







63/14-15.67/35-36, Soi Petchkasem 7/71, Petchkasem Rd.  
Wattana, Bangkok 10600 Thailand.  
Tel: (66) 02-868081213 Fax: (66) 02-8680860 www.jnatec.com

### CERTIFICATE OF CALIBRATION

Certificate No. JN-1407021  
Page 1 of 2 Pages

Measurement Item: 100 ohm resistor with 0.1% tolerance  
Manufacturer: Digi-Tagg, Puchong  
Model/Type: Digi-Tagg, DTS-100, 100 ohm, 0.1%  
Serial Number: 100 ohm, 0.1%  
Lot No.: 100 ohm, 0.1%  
Customer: A/S. Petchkasem 7/71, Petchkasem Rd., Wattana, Bangkok 10600 Thailand.  
Test Conditions: 23.0 ± 0.5 °C, 50% RH, 100 ohm, 0.1%  
Test Results: 100.00 ± 0.01 ohm, 100.00 ± 0.01 ohm, 100.00 ± 0.01 ohm  
Test Conclusion: All results are within the tolerance limits.  
Remarks: The results are within the tolerance limits.  
Measurement Date: 2022-08-02  
Issue Date: 2022-08-02



Approved Signature: [Signature]  
Approved Signature: [Signature]

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Approved Signature: [Signature]  
Approved Signature: [Signature]

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SITHIPORN ASSOCIATES CO., LTD.  
CALIBRATION LABORATORY

451-451/11 Srinakharin Rd, Bangkok, Thailand 10100 THAILAND  
Tel: 2435-8820 Fax: 2435-1679 e-mail: sithiporn@thai.com http://www.sithiporn.com

### Calibration Certificate

Equipment: SOUND CALIBRATOR  
Manufacturer: BUN  
Model: NC-74  
Serial No: 34170123  
ID No: RYL18015  
Condition As Found: GOOD  
Customer: A/S. Petchkasem 7/71, Petchkasem Rd., Wattana, Bangkok 10600 Thailand.  
Location: 451-451/11 Srinakharin Rd, Bangkok, Thailand 10100 THAILAND  
Ambient Temperature: (23.0 ± 0.5) °C  
Pressure: (1013 ± 0.3) hPa  
Relative Humidity: (50.0 ± 2.0) %  
Received Date: 22 AUGUST 2022  
Calibration Date: 01 AUGUST 2022  
Date of Issue: 02 SEPTEMBER 2022  
Calibrated by: Nithakorn Petchkasem  
Approved by: [Signature]  
(Nithakorn Petchkasem)

This certificate is issued in accordance with the requirements of ISO 9001:2015 standard. It may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.



## Continuation of Calibration Certificate

Cert. No. : ACC22023  
Job No. : VCSAC0077  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

## Calibration Method :

This equipment was calibrated by based 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	ET-0008-22	04-Feb-23
Digital Multimeter	33861A	MY53220104	E11-100-040048	09-Feb-23
Digital Multimeter	33861A	MY53220076	E11-100-039245	09-Feb-23
Digital Multimeter	33861A	MY50024273	E11-100-053245	09-Feb-23
Programmable Attenuator	MA1-1070	62100114	E3-0009-22	07-Feb-23
Condenser Microphone	4190	2975001	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-22KAJ	3450405	AA-3035-22	22-Feb-23
Audio Analyzer	AVR-3360A	V74416669	EF-0010-22	07-Feb-23

2. This result of calibration was found accurate as shown on this, 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)

QT-TS-2-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACC22023  
Job No. : VCSAC0077  
Pages : 3 of 3

## Result of calibration :

## 1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	93.04	0.04	0.14	0.40

## 2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1001.5	0.1	0.1	1.0

## 3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.70	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

QT-TS2-04-04-020664

43/45/1 Sotthorn Rd, Banghuanu, Bangko, 10700 THAILAND  
Tel:0-2433-9020 Fax:0-2433-1679 e-mail:calcenter@sithiporn.com http://www.sithiporn.comCert. No. : ACL22183  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42; Microphone UC-52; Preamplifier N9124  
Serial No.: 01073423; 169513/73084  
ID No.: RYG-FS0386

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN-40, PHATTHANAKAN ROAD,  
KHUANG PHATTHANAKAN KHET SUANLUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 51.0 ± 2.0 ) %  
Received Date : 22 AUGUST 2022  
Calibration Date : 26-31 AUGUST 2022  
Date of Issue : 02 SEPTEMBER 2022

Calibrated by : Natchanon Pitsapaisan

Approved by : T. Petchum.  
( Thanakul Petchum )

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QT-TS2-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
Pages : 3 of 8

## Summary of Measurement Result.

Parameter	Pass	Fail	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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.7
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	-	-	-	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

QT-TS-2-04-04-020664

## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
Pages : 4 of 8

## Result of calibration :

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	12.6
C-weight	18.6
Flat	24.5

## 3. Acoustical signal tests of frequency weightings

Note: free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	±0.2	0.2	0.3	±1.5
1000	0.1	0.1	0.1	±1.0
3000	1.5	1.5	1.6	±5.0

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## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
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## 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz:

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

Frequencies Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.3

## 5.2 Time weighting at 1 kHz

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

## 6. Long-term stability

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

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## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
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## 7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	-0.1	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	-0.1	±1.1
9.0	9.0	-0.2	±1.1

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## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
Pages : 7 of 8

## 8. Level linearity including the level range control

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

## 9. Tone burst response

Time Weighting	Time burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)	
Fast	0.25	1	106.0	106.0	0.0	1.5 ± 5.0	
		2	8	117.0	117.0	0.0	1.0 ± 2.5
		200	800	134.0	134.1	0.1	±1.0
Slow	200	8	106.0	106.0	0.0	1.5 ± 5.0	
		2	800	127.6	127.7	0.1	±1.0
		0.25	1	99.0	98.9	-0.1	1.5 ± 5.0
SEL	200	8	106.0	106.0	0.0	1.0 ± 2.5	
		2	800	128.0	128.1	0.1	±1.0

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leq <sub>dB</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.8	-0.6	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

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## Continuation of Calibration Certificate

Cert. No. : ACL22183  
Job No. : VCSAC0077  
Pages : 8 of 8

## 11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.7	89.5	-0.2	±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

QT-TS-2-04-04-020664



## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: NL-42 Microphone UC-52 / Preamplifier NH-24  
Serial No.: 01073608 / 171253 / R574E  
ID No.: RYG-FS0307

Condition As Found: GOOD

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

Location: \_\_\_\_\_  
Ambient Temperature: ( 23.0 ± 3.1 ) °C  
Pressure: ( 101.2 ± 3.1 ) kPa  
Relative Humidity: ( 50.0 ± 2.0 ) %  
Received Date: 03 OCTOBER 2022  
Calibration Date: 18-19 OCTOBER 2022  
Date of Issue: 20 OCTOBER 2022

Calibrated by: Natation Petchuan

Approved by: *T. Petchuan*  
( Thanai Petchuan )

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

QP-TS-17-04-04-020604

## Continuation of Calibration Certificate

Calibration Procedure: CP-AC-01

Cert. No.: ACL22234  
Job No.: VCA5AC0008  
Pages: 2 of 8

## Calibration Method:

This equipment was calibrated by based on ISO/IEC 17025 (2017) Standard for sound level meter (SLM).  
The SLM had tests in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference  
Standard Instruments.

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

## Condition of this result of calibration:

## 1. Reference Standard Instruments

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY48017076	EE-0007-22	04-Feb-23
Waveform Generator	33511B	MY5282742	EE-0008-22	04-Feb-23
Digital Multimeter	33461A	MY5220104	EEI-BP-040505	09-Feb-23
Digital Multimeter	33461A	MY5220276	EEI-BP-050265	09-Feb-23
Digital Multimeter	34461A	MY6024273	EEI-BP-050265	09-Feb-23
Programmable Attenuator	MAI 1070	62100114	EE-0009-22	07-Feb-23
Condenser Microphone	4180	2977600	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-2XAI	M560495	AA-3035-22	22-Feb-23

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).

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## Continuation of Calibration Certificate

## Summary of Measurement Result:

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty (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	-	-	-	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. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.5
11. Overload indication	✓	-	0.2	0.25
12. High-level stability	✓	-	0.1	0.1

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## Continuation of Calibration Certificate

Cert. No.: ACL22234  
Job No.: VCA5AC0008  
Pages: 4 of 8

## Result of calibration:

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.0 (93.9)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	12.0
C-weight	18.1
Flat	23.8

## 3. Acoustical signal tests of frequency weightings

## Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.3	0.4	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.0	-0.9	-0.9	±5.0

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## Continuation of Calibration Certificate

Cert. No.: ACL22234  
Job No.: VCA5AC0008  
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	-0.1	-0.1	±2.0
125	-0.1	0.0	-0.1	±1.5
750	0.0	0.0	-0.1	±1.5
3500	0.0	0.0	-0.1	±1.5
10000	0.0	0.0	0.0	±1.0
20000	0.0	0.0	0.0	±2.0
40000	0.0	0.0	0.0	±3.0
80000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

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

## 5.2 Time weighting at 1 kHz

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

## 6. Long-term stability

Frequency Weighting (dB)	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

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## Continuation of Calibration Certificate

Cert. No.: ACL22234  
Job No.: VCA5AC0008  
Pages: 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
127.0	127.0	0.0	±1.3
136.0	136.0	0.0	±1.3
135.0	135.0	0.0	±1.3
134.0	134.0	0.0	±1.3
133.0	133.0	0.0	±1.3
132.0	132.0	0.0	±1.3
131.0	131.0	0.0	±1.3
129.0	129.0	0.0	±1.3
124.0	124.0	0.0	±1.3
119.0	119.0	0.0	±1.3
114.0	114.0	0.0	±1.3
109.0	109.0	0.0	±1.3
104.0	104.0	0.0	±1.3
99.0	99.0	0.0	±1.3
94.0	94.0	0.0	±1.3
89.0	89.0	0.0	±1.3
84.0	84.1	0.1	±1.3
79.0	79.0	0.0	±1.3
74.0	74.1	0.1	±1.3
69.0	69.0	0.0	±1.3
64.0	64.0	0.0	±1.3
59.0	59.1	0.1	±1.3
54.0	54.0	0.0	±1.3
49.0	49.0	0.0	±1.3
44.0	44.0	0.0	±1.3
39.0	39.0	0.0	±1.3
34.0	34.0	0.0	±1.3
29.0	29.9	-0.1	±1.3
24.0	24.9	-0.1	±1.3
19.0	19.9	-0.1	±1.3
14.0	14.9	-0.1	±1.3
9.0	9.9	-0.1	±1.3
4.0	4.9	-0.1	±1.3

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## Continuation of Calibration Certificate

Cert. No.: ACL22234  
Job No.: VCA5AC0008  
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)
Auto	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time Weighting	Time burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)				Measured Value (dB)				Deviated Value (dB)				Acceptance Limits (dB)			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Fast	0.25	1	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		2	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		3	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		4	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
Slow	0.25	1	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		2	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		3	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		4	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
SEL	0.25	1	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		2	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		3	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5
		4	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5	128.0	127.9	-0.1	1.5

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L <sub>peak</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	135.0	135.0	0.0	-
One	136.4	136.2	-0.2	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	135.0	135.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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## Continuation of Calibration Certificate

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Job No.: VCA5AC0008  
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## 11. Overload indication

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
110.6	99.7	-29.0	-1.5

## 12. High-level stability

Frequency Weighting (dB)	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

45/4511 Sitthorn Rd, Bangna, Bangkok 10710 THAILAND  
Tel: 0-2435-8802 Fax: 0-2431-1679 e-mail: calcenter@sithiporn.com http://www.sithiporn.comCert. No.: ACL22234  
Pages: 1 of 8

## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: NL-42 Microphone UC-52 / Preamplifier NH-24  
Serial No.: 00734223 / 157777 / 22853  
ID No.: RYG-FS0029

Condition As Found: GOOD

Customer: A/S LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTANAKAN 40 PHATTANAKAN ROAD,  
KHWAENG PHATTANAKAN KHIT SUAN LUANG,  
BANGKOK 10250 THAILAND.

Location: \_\_\_\_\_  
Ambient Temperature: ( 23.0 ± 3.1 ) °C  
Pressure: ( 101.2 ± 3.1 ) kPa  
Relative Humidity: ( 50.0 ± 2.0 ) %  
Received Date: 17 MAY 2022  
Calibration Date: 24-27 MAY 2022  
Date of Issue: 30 MAY 2022

Calibrated by: Natation Petchuan

Approved by: *T. Petchuan*  
( Thanai Petchuan )

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

QP-TS-17-04-04-020604



Cert. No. : ACL22115  
Job No. : VC65AC0060  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

#### Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2017) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For test results of each item 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	MY52202742	IE-0008-22	04-Feb-23
Waveform Generator	33511B	MY53220104	IEI-IP-04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220706	IEI-IP-03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024773	IEI-IP-05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	IE-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23

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).

QP-TS12-04-04-020604

T. Petch

Cert. No. : ACL22115  
Job No. : VC65AC0060  
Pages : 3 of 8

#### Summary of Measurement Result :

Parameter	Pass	Fail	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	✓	-	0.3	0.6
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	✓	-	0.3	0.6
Flat 10 Hz to 4 kHz	✓	-	0.3	0.6
Flat 4 kHz to 10 kHz	✓	-	0.3	0.7
Flat 10 kHz to 20 kHz	-	-	-	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-weight level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020604

T. Petch

Cert. No. : ACL22115  
Job No. : VC65AC0060  
Pages : 4 of 8

#### Result of calibration :

##### 1. Absolute sensitivity :

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.0 (93.95)	93.9	0.0	±0.3

##### 2. Self-generated noise

###### 2.1 Normal test

Measured Value (dB)
18.0

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	13.8
C-weight	20.5
Flat	25.8

##### 3. Acoustical signal tests of frequency weightings

Motor free field acoustic response at a level of 94 dB

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

QP-TS12-04-04-020604

T. Petch

Cert. No. : ACL22115  
Job No. : VC65AC0060  
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#### 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.2	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	-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 (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	±0.2
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

##### 5.2 Time weighting at 1 kHz

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

#### 6. Long-term stability

Frequency Weighting (dB)	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

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T. Petch

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Job No. : VC65AC0060  
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	±1.3
135.0	135.0	0.0	±1.3
134.0	134.0	0.0	±1.1
133.0	132.9	-0.1	±1.2
132.0	131.9	-0.1	±1.1
131.0	130.9	-0.1	±1.1
129.0	128.9	-0.1	±1.1
124.0	123.9	-0.1	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	-0.1	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1

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#### 8. Level linearity including the level range control

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

#### 9. Tone burst response

Time Weighting	Tone burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	120.0	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
	2	8	99.0	98.9	-0.2	1.5 ; 5.0
SPL	2	8	108.0	108.0	0.0	1.0 ; 2.5
	200	800	128.0	128.0	0.0	±1.0

#### 10. Peak, C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Leq (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.4	-0.6	±1.0

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	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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#### 11. Overload indication

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

#### 12. High level stability

Frequency Weighting (dB)	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

QP-TS12-04-04-020604

T. Petch

451-451515 4th Floor Bldg. Bangphum, Bangkok 10700 THAILAND  
Tel: 0-2455-8600 Fax: 0-2455-1679 e-mail: cal@si-phai.com si-phai.com  
Cert. No. : ACC22013  
Pages : 1 of 3

### Calibration Certificate

Equipment : SOUND-CALIBRATOR  
Manufacturer : BION  
Model : NC-74  
Serial No. : M178121  
ID No. : RVQ-150213

#### Condition As Found :

GOOD

#### Customer :

ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANAKAN 40 PHATHANAKAN ROAD,  
KHUANG PHATHANAKAN KUT SANITANG,  
BANGKOK, 10250 THAILAND

#### Location :

Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 1.1 ) kPa  
Relative Humidity : ( 50.0 ± 2.0 ) %

Received Date : 22 APRIL 2022  
Calibration Date : 26 APRIL 2022  
Date of Issue : 29 APRIL 2022

Calibrated by : Nithakorn Pichumwan

Approved by : T. Petch  
( Thakorn Pichumwan )

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

QP-TS12-04-04-020604



Cert. No. : ACC22013  
Job No. : VC65AC0060  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

#### Calibration Method :

This equipment was calibrated by based on IEC 60942:2003 Standard.  
The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphones.

#### Condition of this result of calibration :

##### 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52202742	IE-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	IEI-IP-04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220706	IEI-IP-03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024773	IEI-IP-05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	IE-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3302A	V34400609	IE-0010-22	07-Feb-23

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).

QP-TS12-04-04-020604

T. Petch

## Continuation of Calibration Certificate

Cert. No. : AUC12083  
Job No. : VC65AC004  
Pages : 3 of 3

## Result of calibration:

## 1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.1	0.1	0.14	0.40

## 2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1000.1	0.1	0.1	1.0

## 3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
2.02	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

QP-1512-04-04-02064

431-43171 Sittithorn Rd, Banghuan, Bangkapi Bangkok 10700 THAILAND  
Tel: 0-2433-8930 Fax: 0-2433-8939 e-mail: center@stiporn.com http://www.stiporn.comCert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : ME-45 Microphone UC-57 / Pre-amplifier 301-24  
Serial No. : 0023184 / 14487 / 23232  
ID No. : RYO F50-25

Condition As Found : GOOD

Customer : ALSI LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KHWAENG PHATHANAKAN, 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 : 14 JANUARY 2022  
Calibration Date : 21-24 JANUARY 2022  
Date of Issue : 25 JANUARY 2022

REVIEW BY: *[Signature]*  
APPROVED BY: *[Signature]*  
ISSUE DATE: 21/1/22

Calibrated by : Nattakorn Pongpang

Approved by : *[Signature]*  
( Thanakorn Pechum )

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.

QP-1512-04-04-02064

## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

## Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SLM).  
The SLM had tests in Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For test results of each item were made by observation of each instrument 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	MY648017076	FF-001291	10-Feb-22
Waveform Generator	33511B	MY52302742	EE-0011-01	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL-001064	10-Feb-22
Digital Multimeter	33461A	MY53220106	L31-107-030204	08-Feb-22
Digital Multimeter	34461A	MY60024273	131107/25251-1	15-Sep-22
Programmable Attenuator	MAT-1075	62100114	1530-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560095	AA-3003-21	16-Feb-22

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 examined at:

3.1 National Institute of Metrology (Thailand)

3.2 Thailand Institute of Scientific and Technological Research (TISTR)

QP-1512-04-04-02064

## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 3 of 8

## Summary of Measurement Result:

Parameter	Pass	Fail	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	✓	-	0.4	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	-	-	-	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	✓	-	0.7	0.3
9. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.3
12. High level stability	✓	-	0.1	0.1

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## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
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## Result of calibration:

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.56)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
14.2

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

Frequency (Hz)	Measured Value (dB)
A-weight	10.8
C-weight	17.0
Flat	22.8

## 3. Acoustical signal tests of frequency weightings

## Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-0.9	-0.8	-0.8	±5.0

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## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 5 of 8

## 4. Electrical signal tests of frequency weightings

## Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±2.5
250	0.0	0.0	0.0	±3.5
500	0.0	0.0	0.0	±3.5
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	±3.0
8000	0.0	0.1	0.1	±5.0

## 5. Frequency and time weightings at 1 kHz

## 5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
A-weight	94.0	0.0	±0.3
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

## 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
Eq	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 Limit (dB)
A-weight	94.0	94.0	0.0	±0.3

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## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	-0.1	±1.1
131.0	130.9	-0.1	±1.1
130.0	130.0	0.0	±1.1
129.0	129.0	0.0	±1.1
128.0	128.0	0.0	±1.1
127.0	127.0	0.0	±1.1
126.0	126.0	0.0	±1.1
125.0	125.0	0.0	±1.1
124.0	124.0	0.0	±1.1
123.0	123.0	0.0	±1.1
122.0	122.0	0.0	±1.1
121.0	121.0	0.0	±1.1
120.0	120.0	0.0	±1.1
119.0	119.0	0.0	±1.1
118.0	118.0	0.0	±1.1
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1
74.0	74.0	0.0	±1.1
73.0	73.0	0.0	±1.1
72.0	72.0	0.0	±1.1
71.0	71.0	0.0	±1.1
70.0	70.0	0.0	±1.1
69.0	69.0	0.0	±1.1
68.0	68.0	0.0	±1.1
67.0	67.0	0.0	±1.1
66.0	66.0	0.0	±1.1
65.0	65.0	0.0	±1.1
64.0	64.0	0.0	±1.1
63.0	63.0	0.0	±1.1
62.0	62.0	0.0	±1.1
61.0	61.0	0.0	±1.1
60.0	60.0	0.0	±1.1
59.0	59.0	0.0	±1.1
58.0	58.0	0.0	±1.1
57.0	57.0	0.0	±1.1
56.0	56.0	0.0	±1.1
55.0	55.0	0.0	±1.1
54.0	54.0	0.0	±1.1
53.0	53.0	0.0	±1.1
52.0	52.0	0.0	±1.1
51.0	51.0	0.0	±1.1
50.0	50.0	0.0	±1.1
49.0	49.0	0.0	±1.1
48.0	48.0	0.0	±1.1
47.0	47.0	0.0	±1.1
46.0	46.0	0.0	±1.1
45.0	45.0	0.0	±1.1
44.0	44.0	0.0	±1.1
43.0	43.0	0.0	±1.1
42.0	42.0	0.0	±1.1
41.0	41.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1
35.0	35.0	0.0	±1.1
34.0	34.0	0.0	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	25.0	0.0	±1.1

QP-1512-04-04-02064

## Continuation of Calibration Certificate

Cert. No. : AUC12084  
Job No. : VC65AC004  
Pages : 7 of 8

## 8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Auto	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time	Time burst duration, T <sub>b</sub>	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.9	0.1	1.5 ± 0.6
	2	3	117.0	117.0	0.0	1.0 ± 0.5
	200	100	124.0	124.0	0.0	1.5 ± 0.6
Slow	0.25	1	106.0	106.0	0.0	1.5 ± 0.6
	2	3	117.0	117.0	0.0	1.0 ± 0.5
	200	100	124.0	124.0	0.0	1.5 ± 0.6
SEL	0.25	1	96.0	99.9	0.1	1.5 ± 0.6
	2	3	106.0	106.0	0.0	1.0 ± 0.5
	200	100	124.0	124.0	0.0	1.5 ± 0.6

## 10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limit (dB)
Continuous	133.0	133.0	0.0	±1.1
One	136.4	136.4	0.0	±1.1



# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-451/1 Sathorn Rd, Bangkok, Bangkok 10700 THAILAND  
Tel: 0-2435-8802 Fax: 0-2435-8679 e-mail: calcenter@sithiporn.com http://www.sithiporn.com



Cert. No.: ACL22159  
Job No.: VC65AC0069  
Pages: 1 of 8

## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: NL-42 Microphone UC-52 / Pre-amplifier NH-24  
Serial No.: 09472130 / 157754 / 72464  
ID No.: RYG F50403

Condition As Found: GOOD

Customer: A/S LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40 PHATTHANAKAN ROAD,  
KIRAWANG PHATTHANAKAN, KHUET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location: -  
Ambient Temperature: ( 23.0 ± 3 ) °C  
Pressure: ( 101.3 ± 3 ) kPa  
Relative Humidity: ( 50.0 ± 20 ) %  
Received Date: 06 JULY 2022  
Calibration Date: 11-18 JULY 2022  
Date of Issue: 19 JULY 2022

APPROVED BY: *[Signature]*  
THANKU DATU: 01/1/25

Calibrated by: Natchanon Pichaiwan

Approved by: *[Signature]*  
( Thanakul Pichaiwan )

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QF-TS-2-04-04-02064

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
Pages: 2 of 8

Calibration Procedure: CP-AC-01

### Calibration Method:

This equipment was calibrated by based 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 Acoustic 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.	Exp. Date
Waveform Generator	33510A	MY54601796	EF-0005-22	04-Feb-23
Waveform Generator	33511B	MY52320242	E3-0006-22	04-Feb-23
Digital Multimeter	33461A	MY51220104	EEL-IP-040265	09-Feb-23
Digital Multimeter	33461A	MY51220076	EEL-IP-030265	09-Feb-23
Digital Multimeter	34461A	MY50024273	EEL-IP-030265	09-Feb-23
Programmable Attenuator	NAT-1070	42100114	EF-0006-22	07-Feb-23
Condenser Microphone	4189	297500	AA-1011-22	24-Feb-23
Measuring Amplifier	NA-42KA1	3450405	AA-3005-22	22-Feb-23

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 transferable to the international system of unit maintained at:

1. National Institute of Metrology (Thailand).
2. Thailand Institute of Scientific and Technological Research (TISTR).

QF-TS-2-04-04-02064

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
Pages: 3 of 8

### Summary of Measurement Result:

Parameter	Pass	Fail	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	✓	-	0.2	0.6
125 Hz	✓	-	0.2	0.6
1000 Hz	✓	-	0.2	0.6
8000 Hz	✓	-	0.2	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	✓	-	0.3	1.0
For > 10 kHz to 20 kHz	-	-	-	-
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. Time burst response	✓	-	0.2	0.3
10. Peak C-sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
Pages: 4 of 8

### Result of calibration:

#### 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (93.95)	93.9	0.0	±0.5

#### 2. Self-generated noise

##### 2.1 Normal test

Measured Value (dB)
23.4

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

Frequency Weighting	Measured value (dB)
A-weight	15.4
C-weight	21.0
Flat	26.9

#### 3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	-0.3	-0.2	-0.2	±5.0

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# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
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	-0.2	-0.1	±2.0
125	-0.1	0.0	-0.1	±1.5
250	0.0	0.0	-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

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.0	0.0	± 0.2
Flat	93.9	0.0	± 0.2

##### 5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	±0.1
Slow	93.9	0.0	±0.1
Log	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	93.9	94.0	0.1	±0.3

QF-TS-2-04-04-02064

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
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	137.1	0.1	±1.1
138.0	138.1	0.1	±1.1
139.0	139.1	0.1	±1.1
140.0	140.1	0.1	±1.1
141.0	141.1	0.1	±1.1
142.0	142.1	0.1	±1.1
143.0	143.1	0.1	±1.1
144.0	144.1	0.1	±1.1
145.0	145.1	0.1	±1.1
146.0	146.1	0.1	±1.1
147.0	147.1	0.1	±1.1
148.0	148.1	0.1	±1.1
149.0	149.1	0.1	±1.1
150.0	150.1	0.1	±1.1
151.0	151.1	0.1	±1.1
152.0	152.1	0.1	±1.1
153.0	153.1	0.1	±1.1
154.0	154.1	0.1	±1.1
155.0	155.1	0.1	±1.1
156.0	156.1	0.1	±1.1
157.0	157.1	0.1	±1.1
158.0	158.1	0.1	±1.1
159.0	159.1	0.1	±1.1
160.0	160.1	0.1	±1.1
161.0	161.1	0.1	±1.1
162.0	162.1	0.1	±1.1
163.0	163.1	0.1	±1.1
164.0	164.1	0.1	±1.1
165.0	165.1	0.1	±1.1
166.0	166.1	0.1	±1.1
167.0	167.1	0.1	±1.1
168.0	168.1	0.1	±1.1
169.0	169.1	0.1	±1.1
170.0	170.1	0.1	±1.1
171.0	171.1	0.1	±1.1
172.0	172.1	0.1	±1.1
173.0	173.1	0.1	±1.1
174.0	174.1	0.1	±1.1
175.0	175.1	0.1	±1.1
176.0	176.1	0.1	±1.1
177.0	177.1	0.1	±1.1
178.0	178.1	0.1	±1.1
179.0	179.1	0.1	±1.1
180.0	180.1	0.1	±1.1

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# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
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)
Auto	94.0	94.0	0.0	±1.1

#### 9. Time burst response

Time Weighting	Tone burst duration, T <sub>B</sub> (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	±0.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.5	127.6	0.1	±0.0
	0.25	1	99.0	99.8	0.8	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±0.0

#### 10. Peak C-sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Legal (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.6	-0.8	±0.0

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	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

## Continuation of Calibration Certificate

Cert. No.: ACL22159  
Job No.: VC65AC0069  
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#### 11. Overload indication

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

QF-TS-2-04-04-02064

# SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-451/1 Sathorn Rd, Bangkok, Bangkok 10700 THAILAND  
Tel: 0-2435-8802 Fax: 0-2435-8679 e-mail: calcenter@sithiporn.com http://www.sithiporn.com



Cert. No.: ACL22159  
Job No.: VC65AC0069  
Pages: 1 of 8

## Calibration Certificate

Equipment: SOUND LEVEL METER  
Manufacturer: RION  
Model: NL-42 Microphone UC-52 / Pre-amplifier NH-24  
Serial No.: 0090073 / 188466 / 01735  
ID No.: RYG F50494

Condition As Found: GOOD

Customer: A/S LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40 PHATTHANAKAN ROAD,  
KIRAWANG PHATTHANAKAN, KHUET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location: -  
Ambient Temperature: ( 25.0 ± 3 ) °C  
Pressure: ( 101.3 ± 3 ) kPa  
Relative Humidity: ( 50.0 ± 20 ) %  
Received Date: 05 JANUARY 2022  
Calibration Date: 10-12 JANUARY 2022  
Date of Issue: 15 JANUARY 2022

APPROVED BY: *[Signature]*  
NEXT CAL DATE: 01/1/25

Calibrated by: Natchanon Pichaiwan

Approved by: *[Signature]*  
( Thanakul Pichaiwan )

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.

QF-TS-2-04-04-02064

## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
Pages: 2 of 8

Calibration Procedure: CP-AC-01

## Calibration Method:

This equipment was calibrated by based 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 Acoustic chamber and Reference Standard Instruments.  
For tests results of each item were made by observation of each instrument 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	13-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	13-0011-21	10-Feb-22
Digital Multimeter	34461A	MY54575136	13-0010-21	10-Feb-22
Digital Multimeter	34461A	MY53226476	13-0010-21	10-Feb-22
Digital Multimeter	34461A	MY60024273	13-0010-21	10-Feb-22
Programmable Attenuator	MAT 1079	62101114	15-0077-16	06-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	N.A-42CAI	34560495	AA-3009-21	16-Feb-22

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 units maintained at:  
3.1 National Institute of Metrology (Thailand)  
3.2 Thailand Institute of Scientific and Technological Research (TISTR).

QF-TS-2-01-04-020604

## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
Pages: 3 of 8

## Summary of Measurement Result:

Parameter	Pass	Fail	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	✓	-	0.3	0.6
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	✓	-	0.3	0.6
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	✓	-	0.2	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. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS-2-01-04-020604

## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
Pages: 4 of 8

## Result of calibration:

## 1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.56)	93.9	0.0	±0.3

## 2. Self-generated noise

## 2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A-weight	11.6
C-weight	17.8
Flat	23.5

## 3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.2	0.2	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	±0.5

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## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
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	-0.1	-0.1	±0.6
125	0.0	0.0	-0.1	±1.5
250	-0.1	-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	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

## 5.2 Time weighting at 1 kHz:

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

## 6. Long-term stability:

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

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## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
Pages: 6 of 8

## 7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
118.0	118.1	0.1	±1.1
119.0	119.1	0.1	±1.1
120.0	120.0	0.0	±1.1
121.0	121.0	0.0	±1.1
122.0	122.0	0.0	±1.1
123.0	123.0	0.0	±1.1
124.0	124.0	0.0	±1.1
125.0	125.0	0.0	±1.1
126.0	126.0	0.0	±1.1
127.0	127.0	0.0	±1.1
128.0	128.0	0.0	±1.1
129.0	129.0	0.0	±1.1
130.0	130.0	0.0	±1.1
131.0	131.0	0.0	±1.1
132.0	132.0	0.0	±1.1
133.0	133.0	0.0	±1.1
134.0	134.0	0.0	±1.1
135.0	135.0	0.0	±1.1
136.0	136.0	0.0	±1.1
137.0	137.0	0.0	±1.1
138.0	138.0	0.0	±1.1
139.0	139.0	0.0	±1.1
140.0	140.0	0.0	±1.1
141.0	141.0	0.0	±1.1
142.0	142.0	0.0	±1.1
143.0	143.0	0.0	±1.1
144.0	144.0	0.0	±1.1
145.0	145.0	0.0	±1.1
146.0	146.0	0.0	±1.1
147.0	147.0	0.0	±1.1
148.0	148.0	0.0	±1.1
149.0	149.0	0.0	±1.1
150.0	150.0	0.0	±1.1
151.0	151.0	0.0	±1.1
152.0	152.0	0.0	±1.1
153.0	153.0	0.0	±1.1
154.0	154.0	0.0	±1.1
155.0	155.0	0.0	±1.1
156.0	156.0	0.0	±1.1
157.0	157.0	0.0	±1.1
158.0	158.0	0.0	±1.1
159.0	159.0	0.0	±1.1
160.0	160.0	0.0	±1.1
161.0	161.0	0.0	±1.1
162.0	162.0	0.0	±1.1
163.0	163.0	0.0	±1.1
164.0	164.0	0.0	±1.1
165.0	165.0	0.0	±1.1
166.0	166.0	0.0	±1.1
167.0	167.0	0.0	±1.1
168.0	168.0	0.0	±1.1
169.0	169.0	0.0	±1.1
170.0	170.0	0.0	±1.1
171.0	171.0	0.0	±1.1
172.0	172.0	0.0	±1.1
173.0	173.0	0.0	±1.1
174.0	174.0	0.0	±1.1
175.0	175.0	0.0	±1.1
176.0	176.0	0.0	±1.1
177.0	177.0	0.0	±1.1
178.0	178.0	0.0	±1.1
179.0	179.0	0.0	±1.1
180.0	180.0	0.0	±1.1
181.0	181.0	0.0	±1.1
182.0	182.0	0.0	±1.1
183.0	183.0	0.0	±1.1
184.0	184.0	0.0	±1.1
185.0	185.0	0.0	±1.1
186.0	186.0	0.0	±1.1
187.0	187.0	0.0	±1.1
188.0	188.0	0.0	±1.1
189.0	189.0	0.0	±1.1
190.0	190.0	0.0	±1.1
191.0	191.0	0.0	±1.1
192.0	192.0	0.0	±1.1
193.0	193.0	0.0	±1.1
194.0	194.0	0.0	±1.1
195.0	195.0	0.0	±1.1
196.0	196.0	0.0	±1.1
197.0	197.0	0.0	±1.1
198.0	198.0	0.0	±1.1
199.0	199.0	0.0	±1.1
200.0	200.0	0.0	±1.1

QF-TS-2-01-04-020604

## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
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)
Auto	94.0	94.0	0.0	±1.1

## 9. Time burst response

Time Weighting	Time burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	106.0	107.9	+0.1	1.5 ± 0.8
	2	8	117.0	116.9	-0.1	1.0 ± 0.5
	200	800	134.0	134.0	0.0	±1.0
Slow	0.25	1	106.0	108.0	+0.2	1.5 ± 0.8
	2	8	127.5	127.6	+0.1	±1.0
	200	800	149.0	149.8	+0.8	1.5 ± 0.8
SEL	0.25	1	109.0	108.8	-0.2	1.5 ± 0.8
	2	8	128.0	127.9	-0.1	1.0 ± 0.5
	200	800	178.0	178.0	0.0	±1.0

## 10. Peak C-weight level

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, Lepesh ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	-
One	136.4	136.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	113.0	113.0	0.0	-
Positive half cycle	113.4	113.1	-0.3	+2.0
Negative half cycle	113.4	113.1	-0.3	+2.0

QF-TS-2-01-04-020604

## Continuation of Calibration Certificate

Cert. No.: ACL12028  
Job No.: VC65AC0040  
Pages: 8 of 8

## 11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.7	0.2
Negative one-half cycle	89.7	0.2

## 12. High level stability

Frequency Weighting	SI M Display at initial (dB)	SI M Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	117.0	117.0	0.0	±0.3

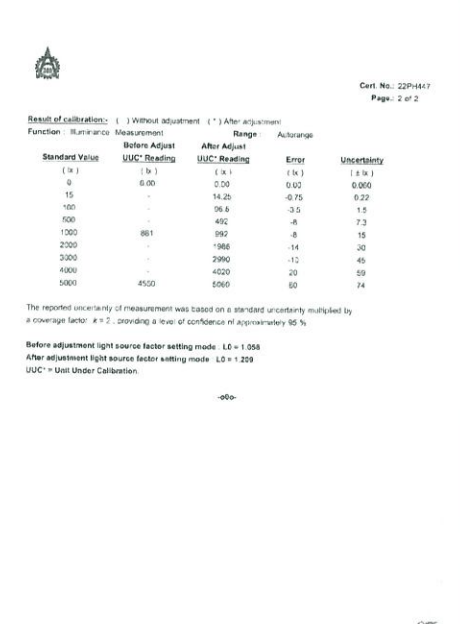
The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k=2$   
or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

QF-TS-2-01-04-020604

Rotameter ID	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS0577	01 Oct 22	$Y = 1.0202x + 0.1978$	1.0000
BKK_FS0579	01 Oct 22	$Y = 1.0078x + 0.4789$	0.9998
BKK_FS0583	01 Oct 22	$Y = 1.0161x + 0.3922$	1.0000
BKK_FS0584	01 Oct 22	$Y = 1.0036x + 2.2262$	0.9997
BKK_FS0585	01 Oct 22	$Y = 1.0189x + 5.6476$	0.9997
BKK_FS0586	01 Oct 22	$Y = 1.0096x + 1.1524$	0.9995
BKK_FS0587	01 Oct 22	$Y = 1.0131x + 3.6019$	0.9998
BKK_FS0588	01 Oct 22	$Y = 1.0154x + 4.8357$	0.9999
BKK_FS0589	01 Oct 22	$Y = 0.9918x + 4.8069$	0.9999
BKK_FS0590	01 Oct 22	$Y = 1.0038x + 0.4857$	0.9996
BKK_FS0591	01 Oct 22	$Y = 0.9705x + 52.174$	0.9986
BKK_FS0592	01 Oct 22	$Y = 0.9846x + 37.642$	0.9985
BKK_FS0593	01 Oct 22	$Y = 0.9767x + 58.445$	0.9988
BKK_FS0594	01 Oct 22	$Y = 0.9902x + 62.87$	0.9999
BKK_FS0595	01 Oct 22	$Y = 1.0249x + 88.182$	0.9999
BKK_FS0596	01 Oct 22	$Y = 0.9843x + 20.858$	0.9991
BKK_FS0597	01 Oct 22	$Y = 0.9802x + 61.653$	0.9978
BKK_FS1004	01 Oct 22	$Y = 0.9752x + 11.724$	0.9996
BKK_FS1005	01 Oct 22	$Y = 1.0081x + 1.5143$	1.0000
BKK_FS1006	01 Oct 22	$Y = 1.006x + 2.9327$	0.9999
BKK_FS1007	01 Oct 22	$Y = 0.9917x + 1.6592$	1.0000
BKK_FS1008	01 Oct 22	$Y = 1.0132x + 0.7207$	1.0000
BKK_FS1009	01 Oct 22	$Y = 1.0132x + 1.1633$	0.9990
BKK_FS1010	01 Oct 22	$Y = 1.0033x + 0.5758$	0.9999
BKK_FS1011	01 Oct 22	$Y = 1.0224x + 0.759$	0.9998
BKK_FS1012	01 Oct 22	$Y = 1.0109x + 2.0048$	0.9997
BKK_FS1013	01 Oct 22	$Y = 0.9877x + 35.851$	0.9997
BKK_FS1014	01 Oct 22	$Y = 1.0021x + 0.3148$	0.9998
BKK_FS1015	01 Oct 22	$Y = 0.9904x + 1.786$	1.0000
BKK_FS1016	01 Oct 22	$Y = 1.0105x + 80.265$	0.9998
BKK_FS1017	01 Oct 22	$Y = 0.9906x + 6.489$	1.0000
BKK_FS1018	01 Oct 22	$Y = 1.0011x + 1.786$	1.0000
BKK_FS1019	01 Oct 22	$Y = 1.0023x + 68.424$	0.9990
BKK_FS1020	01 Oct 22	$Y = 1.0547x + 0.666$	0.9998
BKK_FS1021	01 Oct 22	$Y = 1.18x + 33.266$	0.9998
BKK_FS1022	01 Oct 22	$Y = 0.9899x + 0.036$	0.9999
BKK_FS1023	01 Oct 22	$Y = 1.0004x + 0.0717$	0.9999
BKK_FS1024	01 Oct 22	$Y = 1.0542x + 0.4686$	0.9997
BKK_FS1025	01 Oct 22	$Y = 1.0132x + 88.507$	0.9996





**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22CH405  
Page: 1 of 3

**Equipment:** pH Meter  
**Manufacturer:** Mettler Toledo  
**Model:** Seven Compact 5270  
**Serial No.:** C10429460  
**ID No.:** RYG/EN0183  
**Condition As-Received:** Used Item  
**Received Date:** 16 March 2022  
**Calibration Date:** 17 March 2022  
**Reference:** 2205-06110SC-4  
**Submitted by:** ALS Laboratory Group (Thailand) Co. Ltd.  
Rayong Branch  
616/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand

**Ambient Temperature:** (25 ± 2.5) °C  
**Relative Humidity:** (50 ± 15) %  
**Calibration Procedure:** In-house method  
CP-C16 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)  
- CP-C16 by comparison with standard thermometer

**Calibrated by:** Warasorn Lemgratkul  
**Approved by:** [Signature]  
[ ] Meera Buthusa  
[ ] Sathit Meangma  
[ ] Warasorn Lemgratkul  
**Issue Date:** 22 March 2022  
The uncertainty is for a confidence probability of approximately 95 %  
This certificate may not be reproduced after that it is signed with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services  
Approved by the head of Corporate Services 3: Equipment Calibration and Testing Services

REVIEW BY: N. Buthusa  
APPROVED BY: [Signature]  
NEXT CAL DATE: 17/3/23

A 0037307

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22CH405  
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 5423049 130RC116 21E2662 25 Aug 2022  
2) Ref. Standard Thermometer 4902054 110RC044 2112021 26 Oct 2022  
This certificate is traceable to the International System of Unit maintained at -  
Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials: The measurement results are traceable to SI through CPA chem Ltd., ANS-ASD National Accreditation Board, Accredited No. AN-1829

**Buffer Solution:** Manufacturer: Lot No. Exp. date  
pH 4.008 CPA chem 75695 01 Jan 2024  
pH 6.982 CPA chem 75117 02 Aug 2022  
pH 10.015 CPA chem 756824 04 Sep 2022

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

**Calibration Result:**  
Function: mV Measurement  
Performing standard curve by Pilsa at pH (4.7,10)

Unit Under Calibration	Standard Value	Standard Voltage Input	Actual Reading	Uncertainty of Measurement	Coverage factor
pH Meter	4.000	177.48	177.4	0.058	2.00
SN: C10429460	7.000	0.00	-0.1	7.000	0.058
	10.000	-177.48	-177.5	10.000	0.058

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 17/3/23

A 1100955

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22CH405  
Page: 3 of 3

**Calibration Result:**  
Function: pH Measurement  
Performing time 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
pH Electrode	4.008	4.010	177.7	0.0046	2.00
SN: 1423404	6.982	6.988	3.6	0.0064	2.00
	10.015	10.010	-172.9	0.0073	2.00

**Function: Temperature Measurement**  
(\*) Without adjustment  
This equipment was connected with Temperature Probe:  
- Model: HLAS Expert Pro-ISM  
- Serial No.: 1423404

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
25.0	25.002	24.9	-0.102	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 %.

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 17/3/23

A 1100954

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22CH406  
Page: 1 of 2

**Equipment:** pH Meter  
**Manufacturer:** Mettler Toledo  
**Model:** Seven Compact 5270  
**Serial No.:** C10429460  
**ID No.:** RYG/EN0183  
**Condition As-Received:** Used Item  
**Received Date:** 16 March 2022  
**Calibration Date:** 21 March 2022  
**Reference:** 2205-06110SC-4  
**Ambient Temperature:** (25 ± 2.5) °C  
**Relative Humidity:** (50 ± 15) %  
**Calibration Procedure:** In-house method  
CP-C16 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)  
- CP-C16 by comparison with standard thermometer

**Calibrated by:** Warasorn Lemgratkul  
**Approved by:** [Signature]  
[ ] Meera Buthusa  
[ ] Sathit Meangma  
[ ] Warasorn Lemgratkul  
**Issue Date:** 22 March 2022  
The uncertainty is for a confidence probability of approximately 95 %  
This certificate may not be reproduced after that it is signed with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services  
Approved by the head of Corporate Services 3: Equipment Calibration and Testing Services

REVIEW BY: N. Buthusa  
APPROVED BY: [Signature]  
NEXT CAL DATE: 17/3/23

A 0037307

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22CH406  
Page: 2 of 2

**Result of calibration:** (\*) Without adjustment (\*) After adjustment  
Function: DC voltage measurement  
Standard Value: UUC\* Reading: Range: 2000 mV  
(mV) (mV) (mV) (± μV)  
200.0000 200.0 0.0 72  
-150.0000 -150.0 0.0 59  
-100.0000 -100.0 0.0 65  
-50.0000 -50.0 0.0 62  
0.0000 0.0 0.0 58  
50.0000 50.0 0.0 62  
100.0000 100.0 0.0 65  
150.0000 150.0 0.0 69  
200.0000 200.0 0.0 72

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

\*UUC\* = Unit Under Calibration.

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 17/3/23

A 1101070

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
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154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Testing**

Cert. No.: 22TH404  
Page: 1 of 2

**Equipment:** DO Meter  
**Manufacturer:** YSI  
**Model:** 5000-119V  
**Serial No.:** 15E102796  
**ID No.:** RYG/EN0032  
**Received Date:** 11 February 2022  
**Test Date:** 14 February 2022  
**Reference:** 2202-04040SC-4  
**Submitted by:** ALS Laboratory Group (Thailand) Co. Ltd.  
Rayong Branch  
616/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand

**Laboratory Condition:** Temperature: (25 ± 5) °C  
Humidity: (50 ± 20) %  
**Test Procedure:** In-house method CP-C16  
by Comparison Technique with Aris-Matification Method

**Tested by:** Warasorn Lemgratkul  
**Approved by:** [Signature]  
[ ] Meera Buthusa  
[ ] Sathit Meangma  
[ ] Warasorn Lemgratkul  
**Issue Date:** 18 February 2022

REVIEW BY: N. Buthusa  
APPROVED BY: [Signature]  
NEXT CAL DATE: 15/3/23

A 0284414

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22TH404  
Page: 2 of 2

**Result:** Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Pre-adj. No.: 15E102484

Titration Method (Arise Modification Method)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.02	8.02	0.0064

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concern: intend to use for advertising and reference purpose is prohibited. This report may not be reproduced other in L2 without written approval of the laboratory.

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APPROVED BY: [Signature]  
NEXT CAL DATE: 15/3/23

A 1094744

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22LM12  
Page: 1 of 2

**Equipment:** DO Meter with Sensor  
**Manufacturer:** YSI  
**Model:** 5000-119V  
**Serial No.:** 15E102796  
**ID No.:** RYG/EN0032  
**Submitted by:** ALS Laboratory Group (Thailand) Co. Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand  
**Location:** TPA On Site Calibration Laboratory

**Received Order:** 11 February 2022  
**Calibrated Date:** 21 February 2022  
**Ambient Temperature:** (26 ± 10) °C  
**Relative Humidity:** (50 ± 30) %  
**AC Line Voltage:** (220 ± 22) V

**Calibrated by:** Kunthit Promrat  
**Approved by:** [Signature]  
[ ] Punthippa Tamayaku  
[ ] Meera Buthusa  
[ ] Sathit Meangma  
**Issue Date:** 21 February 2022

The uncertainty is for a confidence probability of approximately 95 %  
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REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 15/3/23

A 0038008

**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
154 PITTANAKARN ROAD NO. 18, MAEHAENG, SUKHOLAI, BANGKOK 10250  
TEL: 0-2717-3899-27 FAX: 0-2717-4981

**Certificate of Calibration**

Cert. No.: 22LM12  
Page: 2 of 2

**Equipment:** DO Meter with Sensor  
**Condition As-Received:** Used Item  
**Reference:** 2202-04040SC-5

**Procedure Used:**  
Calibration was conducted using in-house calibration procedure CP-C161 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) in Temperature Bath.  
The temperature scale used was based on ITS-90.

**Condition of this result of calibration:**  
1. Reference standard instrument:  
Instrument: Model: Serial No. Cert. No. Due Date  
1) Digital Thermometer 1523 218900 2111273 22 Nov 2022  
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.

**Result of Calibration:** (\*) Without Adjustment  
Function: Temperature measurement  
This instrument was connected with temperature sensor: SN: 15E102484

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage factor
20.00	45	20.001	19.88	-0.121	0.15	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 %.

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 15/3/23

A 1095714









## ภาคผนวก จ

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สำเนาหนังสือใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน





๓๖) นายสมบุรณ์ บุตรจันทร์  
๓๗) นายวิรัตน์ ไชยเมธา  
๓๘) นายอนุวัฒน์ เหมพูน  
๓๙) นายจิรนต์ ขวาละออง  
๔๐) นายสมโภช วันสา  
๔๑) นายอัสริ นามบุรี  
๔๒) นายณัฐนันท์ ปานประเสริฐ  
๔๓) นายอัครพร จอัสว  
๔๔) นายประเสริฐ สุระพันธ์  
๔๕) นายบุญกุล จันทร์เนียม  
๔๖) นายพิรพงษ์ ทองคุณปริศา  
๔๗) นายณัฐพล ทองบุษ  
๔๘) นายอัครวัฒน์ ม่วงนพร  
๔๙) นายเจตตราวุฒิ ปิตะธนะ  
๕๐) นายกฤษณะ สายวรรณ  
๕๑) นายพิชัย บุญยงค์  
๕๒) นายภาณุพงศ์ โสมวงค์  
๕๓) นายสามารถ คู่มณี  
๕๔) นายสิริชัย โกศลวิมาน  
๕๕) นายณัฐวุฒิ ศรีประเสริฐ  
๕๖) นายชวลิตชัย นาคพณ  
๕๗) นายพงษ์ศรี จันทิพย์  
๕๘) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี  
๕๙) นายสิทธิโชค ทาสีดา  
๖๐) นายอนันต์ อินสุตา  
๖๑) นางสาววรรณิชา ขาดีวันชัย  
๖๒) นางสาวพิมพ์ตะวัน มีนาบุญ  
๖๓) นางสาวเพชรรัตน์ สิงห์สมบุญ  
๖๔) นางสาวศุภณีน พรหมจันทร์  
๖๕) นายกิตติ ทวีราช  
๖๖) นายจักริน หนักรวิธา  
๖๗) นายณัฏฐชัย สุขเปี้ย  
๖๘) นายณรรณนที ตั้งทองคำ  
๖๙) นายศุภพล สมนอก  
๗๐) นายทักขณีย์ อุบลศรี  
๗๑) นายธนกร นามะกุลญา  
๗๒) นายอดิพงษ์ บ้านคง

ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๓๔  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๓๕  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๓๖  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๓๗  
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ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๑  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๒  
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ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๖  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๗  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๘  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๔๙  
ทะเบียนเลขที่ ๖-๒๐๔-๑-๕๕๕๐  
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(นายศิระ จันทร์เฒ่า)

นักวิทยาศาสตร์ชำนาญการพิเศษ วิทยาเขตภาคเหนือ  
ผู้อำนวยการกองวิจัยและพัฒนาระบบสารสนเทศ  
มหาวิทยาลัยราชภัฏเชียงใหม่

๑๐๔) นายณนพชัย...

๑๐๕) นายณนพชัย สุปัทม  
๑๐๖) นายณัฐพล คุณสุทธิ  
๑๐๗) นายณัฐวัฒน์ สาริน  
๑๐๘) นายปิยะนัฐ พลชนะศรี  
๑๐๙) นายพงษ์ศิริ โสมเขียว  
๑๑๐) นายพิรพัฒน์ กำคำ  
๑๑๑) นายสิริวัฒน์ ทองอิน  
๑๑๒) นายมงคล ผลาทิพย์  
๑๑๓) นายณัฐวัฒน์ พูลศิริ  
๑๑๔) นายสิริวัฒน์ ทองอิน  
๑๑๕) นายอเนชา หันสมัย  
๑๑๖) นายอดิศักดิ์ ฝอย  
๑๑๗) นายณัฐชัย วิเศษ  
๑๑๘) นายณัฐชัย เชื้อทอง  
๑๑๙) นายวรุฒม์ ตันก  
๑๒๐) นายเสงี่ยม นระศักดิ์  
๑๒๑) นายสุทธพงศ์ รัตน  
๑๒๒) นายชัชวาลย์ ไชยชนะ  
๑๒๓) นายวิศรุต ศรีธรรมมา  
๑๒๔) นายณนกร เมืองทอง  
๑๒๕) นายกัญญา สุทธิ  
๑๒๖) นางสาวณัฐรัตน์ ภัทระเล  
๑๒๗) นางสาวประภากรณ บุตรพรม  
๑๒๘) นางสาวนิลาธิยา นามพรม  
๑๒๙) นางสาวพัชรินทร์ แสนร้อย  
๑๓๐) นายไพโรจน์ เปี่ยมพิมาย  
๑๓๑) นางสาวศุภมาศ ทองมาก  
๑๓๒) นางสาวกัญญา จิตสว่าง  
๑๓๓) นางสาววิมล เล็กอุทัย  
๑๓๔) นางสาวกัญญาพร คำมีแก้ว  
๑๓๕) นางสาวสุกัญญา ภาณุภูมิ  
๑๓๖) นางสาวภาณุมาศ คงคุณ  
๑๓๗) นางสาวไพโรจน์ ศรีวิ  
๑๓๘) นางสาวทิพวรรณ ผุยปัญญา  
๑๓๙) นางสาวสุภาวดี ปานทอง  
๑๔๐) นางสาวอริสา ทองนวล  
๑๔๑) นางสาวอริสา คำคล่อง

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นักวิทยาศาสตร์ชำนาญการพิเศษ วิทยาเขตภาคเหนือ  
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มหาวิทยาลัยราชภัฏเชียงใหม่

๑๔๖) นางสาวสุภาวดี...

๑๔๖) นางสาวสุภาวดี สุนทรสนาน  
๑๔๗) นางสาวสุภาวดี นนทประสา  
๑๔๘) นางสาววันจิตร เนียมกลาง  
๑๔๙) นางสาวกัญญาวิรัตน์ ศรีนิลพา  
๑๕๐) นางสาวอัญญาณี คำจันทร์  
๑๕๑) นายบุญฤทธิ์ เขื่อนเทพ  
๑๕๒) นายศิริวัฒน์ พานิชย์  
๑๕๓) นางสาวศุภมาศ ปิยะมูรา  
๑๕๔) นางสาวภาณุณี คุณน่าน  
๑๕๕) นางสาวจิราจิด ทองคำ  
๑๕๖) นางสาวกนกวรรณ สุระ  
๑๕๗) นางสาวอารยา มีชัย  
๑๕๘) นางสาวจิตสุภา ประเพ็ญสุข  
๑๕๙) นางสาวอริสา วิรัชสินธรรม  
๑๖๐) นางสาววิรัชดา นาคพณ  
๑๖๑) นางสาวพนิดา ยอดอินทร์  
๑๖๒) นางสาวนันทิยา จันทร์สุน

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(นายศิระ จันทร์เฒ่า)

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มหาวิทยาลัยราชภัฏเชียงใหม่

เอกสารแนบท้ายหนังสือรับข้ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร

บริษัท เอลเลียต แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ กอ ๐๓๐(๑) ๑๐๖๕ ลงวันที่ ๒๕ มกราคม ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๖๖ รายการ

แนบรายชื่อ จำนวน 59 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(4)</sup>
6	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(4)</sup>
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>(4)</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>(4)</sup>
12	Carbaryl	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
13	Carbofuran	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(4)</sup>
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method <sup>(4)</sup> 2) Closed Reflux, Titrimetric Method <sup>(4)</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
17	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(4)</sup>
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method

(นางวิภาดา จันทร์สุวรรณ์)

ผู้อำนวยการศูนย์บริการวิเคราะห์ทดสอบและ  
พัฒนาระบบข้อมูลสารสนเทศ

19 Copper...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
20	Cyanide	Distillation, Colorimetric Method <sup>(4)</sup>
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
33	Formaldehyde	Distillation, Colorimetric Method <sup>(3)</sup>
34	Free Chlorine	1) DPD Ferrous Titrimetric Method <sup>(4)</sup> 2) Iodometric Method <sup>(4)</sup>
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
36	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
37	Hexavalent Chromium	Filtration, Colorimetric Method <sup>(4)</sup>
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
39	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
40	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass spectrometric Method <sup>(4)</sup>
42	Methiocarb	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>

วิมล  
(นางธิภาณณ์ อัครสกุลวิไล)  
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์มลพิษ  
กรมควบคุมมลพิษ

44 Methomyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
44	Methomyl	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
45	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>(4)</sup> 2) Soxhlet Extraction Method <sup>(4)</sup>
47	Oxamyl	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
48	Propoxur	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
49	pH	Electrometric Method <sup>(4)</sup>
50	Phenols	1) Distillation, Chloroform Extraction Method <sup>(4)</sup> 2) Distillation, Direct Photometric Method <sup>(4)</sup>
51	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
52	Sulfide	Iodometric Method <sup>(4)</sup>
53	Temperature	Laboratory and Field Methods <sup>(4)</sup>
54	Total Dissolved Solids	Dried at 180 °C <sup>(4)</sup>
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>(4)</sup>
56	Total Suspended Solids	Dried at 103-105 °C <sup>(4)</sup>
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(4)</sup>
58	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>(4)</sup>
59	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(4)</sup>

น้ำดื่ม จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

วิมล  
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3 Aldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

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18 Bis(2-ethylhexyl)phthalate...


ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
22	Butyl Benzyl Phthalate	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>

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34 Chromium (III)...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>(4)</sup>
35	Chromium (VI)	Colorimetric Method <sup>(4)</sup>
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
37	Cyanide	Distillation, Colorimetric Method <sup>(4)</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

  
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
51 cis-1,2-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
63	Di-n-Octyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

  
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68 Fluorene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
83	Mercury	1) Cold Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>

  
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 กรมควบคุมมลพิษ

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
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 <sup>(4)</sup>

  
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97 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
98	pH	Electrometric Method <sup>(4)</sup>
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
100	Phenol	1) Distillation, Direct Photometric Method <sup>(4)</sup> 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
102	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
103	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
109	TPH (C <sub>9</sub> -C <sub>9</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(13,24)</sup>
110	TPH (C <sub>10</sub> -C <sub>16</sub> )	Solvent Extraction, Gas Chromatographic Method <sup>(9,21)</sup>
111	TPH (C <sub>16</sub> -C <sub>33</sub> )	Solvent Extraction, Gas Chromatographic Method <sup>(9,21)</sup>
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

  
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 มลพิษในสิ่งแวดล้อม

114 1,1,2-Trichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
126	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>


จากภาคเสีย (ป่องระเหย) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup>
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup>

  
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 มลพิษในสิ่งแวดล้อม

3 Carbon Monoxide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Carbon Monoxide	1) Sampling Bag Non-Dispersive Infrared Method <sup>(5)</sup> 2) Non-Dispersive Infrared Method <sup>(5)</sup> 3) Instrumental Analyzer Method <sup>(5)</sup>
4	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>(5)</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>(5)</sup>
5	Copper	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup>
6	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) <sup>(5)</sup>
7	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>(5)</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>(5)</sup>
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>(5)</sup>
9	Lead	Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup>
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(5)</sup> 2) Isokinetic, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup>
11	Opacity	Ringelmann's Method <sup>(5)</sup>
12	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>(5)</sup> 2) Chemiluminescence Method <sup>(5)</sup> 3) Instrumental Analyzer Method <sup>(5)</sup>
13	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup> 2) UV Fluorescence Method <sup>(5)</sup> 3) Instrumental Analyzer Method <sup>(5)</sup>
14	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup>
15	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>(5)</sup>
16	Xylene	Absorption Sampling, Gas Chromatographic Method <sup>(5)</sup>

  
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สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,22)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(16,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,16)</sup>

  
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 มลพิษในสิ่งแวดล้อม

6 Cadmium...



ลำดับที่	สารเคมี	วิธีวิเคราะห์
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,6,15,17)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,6,16,17)</sup> 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,15,17)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,16,17)</sup>
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method <sup>(1,6,17)</sup> 2) Alkaline Digestion, Colorimetric Method <sup>(8,17)</sup>

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11 Cobalt...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup>

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2) Soxhlet...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup> 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(1,6,18)</sup>

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2) Waste Extraction...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method <sup>(1,6,19)</sup> 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(1,6,20)</sup> 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(1,18)</sup> 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method <sup>(1,19)</sup> 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(20)</sup>
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,25)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>

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27 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4,6'-Pentachlorobiphenyl - 2,2',3,4,4',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	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>(1,5,23)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,23)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>

  
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
ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,23)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
29	pH	Electrometric Method <sup>(29,30)</sup>
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,23)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup>

  
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup> 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,15)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,16)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>

สืบ จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,24)</sup>
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>

  
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,24)</sup>
11	Benzo(b)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
12	Benzo(k)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
14	Benzo(a)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
15	Benzo(g,h,i)perylene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,24)</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,24)</sup>
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(12,24)</sup>
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,16)</sup>
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(25,31)</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(14,24)</sup>

  
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ลำดับที่	สารเคมี	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,15,17)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,16,17)</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>(8,17)</sup>
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>(26,27,28)</sup>
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

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40 DDE...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
41	DDT	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
42	Dibenz(a,h)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>

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57 Dieldrin...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
58	Diethyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
59	2,4-Dimethylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
60	2,4-Dinitrophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
61	2,4-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
62	2,6-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
63	Di-n-Octyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
67	Fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
68	Fluorene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

Signature  
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71 Hexachlorobenzene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(14)</sup>

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2) Thermal...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry <sup>(19)</sup> 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(20)</sup> Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(12,24)</sup>
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(25,31)</sup>

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- Aroclor 1242...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
	- 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',5,5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6-Nonachlorobiphenyl - 2,2',3,3',4,4',5,6-Nonachlorobiphenyl	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

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และศูนย์วิจัยและพัฒนา

101 Selenium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
102	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,22)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
108	TPH (C <sub>5</sub> -C <sub>6</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
109	TPH (C <sub>8</sub> -C <sub>10</sub> )	1) Solvent Extraction, Gas Chromatographic Method <sup>(11,21)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(21,31)</sup>
110	TPH (C <sub>16</sub> -C <sub>35</sub> )	1) Solvent Extraction, Gas Chromatographic Method <sup>(11,21)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(21,31)</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>

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116 2,4,6-Trichlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(25,31)</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(14,24)</sup>
125	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(7,15)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,14)</sup>

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7. United States...



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20. United States

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มหาวิทยาลัยราชภัฏวไลยอลงกรณ์

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลพิษและทะเบียนห้องปฏิบัติการ กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๒๐๒ ๔๐๐๒, ๔๑๔๖



ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๔ มิถุนายน ๒๕๖๔

เรื่อง จัณฑ์เบญนทองค์ปภิตการวิเคราะหฺเอกชน

เขียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลนธราทอรี่ กริป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์เอกซเรย์ พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ  
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน 7-๓๒๓ สถานที่ตั้งเลขที่ ๖๓๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ค้อ อำเภอปลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่	ว-๓๒๓-ก-๙๔๔๒
๒) นางวิลาวัลย์ บริรักษ์	ทะเบียนเลขที่	ว-๓๒๓-ก-๙๔๔๓
๓) นายสุพจน์ สกลมเต๊ะ	ทะเบียนเลขที่	ว-๓๒๓-ก-๙๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวนฤมล บรรจงกิจ	ทะเบียนเลขที่	ว-๒๓๓-จ-๑๙๙๙๑
๒) นางจรรยา สิตา	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๓) นางสาวอนิศา กุลสุวรงค์	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๕) นายชวลิตชัย สุนทร	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๖) ว่าที่ ร.ต.รณชัย ม่วงงาม	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๗) นายวรวิทย์ หันพา	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๘) นายศักดิ์สินวัชร จรัสกลาง	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๙) นายสุรศักดิ์ สาทิน	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๑๐) นางสาวเพ็ญอรุณ ภู่กวนานันท์	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๑๑) นายภาณุภาพ ลาแก้ว	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑
๑๒) นายสุรศักดิ์รุ่งรงค์ โชติปัญนันท์	ทะเบียนเลขที่	ว-๒๓๓๑-จ-๑๙๙๙๑

๑๓) นายวัลลภ...

- ๓๐) นายวิธิตา ทนไชยเนตร์
- ๓๑) นางสาววราวิภา เทพบุตรเจริญกุล
- ๓๒) นางสาววรรณา หงษ์สุทัศน์
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- ๔๑) นายปฐมพงษ์ กรสวัสดิ์
- ๔๒) นายสืบ ตันพันธ์
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- ๖๑) นายปัทมกร กลวาศิ

[illegible]

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ  
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ  
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นางนงคา เดชชะรินทร์)  
ผู้อำนวยการกองวิจัยและพัฒนาระบบการตรวจวิเคราะห์  
ปฏิกิริยาการทดสอบด้วยเครื่องมือวิเคราะห์

๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและพัฒนาระบบการตรวจวิเคราะห์  
ศูนย์วิจัยและพัฒนาระบบการตรวจวิเคราะห์โรงงานภาคตะวันออก  
โทร. ๐ ๒๘๐๕ ๙๐๖๑-๓  
ไปรษณีย์อิเล็กทรอนิกส์ eirw@dlw.mail.go.th


เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอนดอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๗-๒๐๓  
ที่ อก ๐๓๐๑(๒)/ ๒๕๖๕ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ  
น้ำเสีย จำนวน ๑๔ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method <sup>(2)</sup> 2) 5 Day BOD Test, Azide Modification Method <sup>(2)</sup>
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method <sup>(2)</sup> 2) Closed Reflux, Colorimetric Method <sup>(2)</sup> 3) Closed Reflux, Titrimetric Method <sup>(2)</sup>
3	Color	ADMI Weighted - Ordinate Spectrophotometric Method <sup>(2)</sup>
4	Cyanide	Distillation, Colorimetric Method <sup>(2)</sup>
5	Formaldehyde	Distillation, Colorimetric Method <sup>(1)</sup>
6	Free Chlorine	DPD-Ferrous Titrimetric Method <sup>(2)</sup>
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method <sup>(2)</sup>
8	pH	Electrometric Method <sup>(2)</sup>
9	Phenols	1) Distillation, Chloroform Extraction Method <sup>(2)</sup> 2) Distillation, Direct Photometric Method <sup>(2)</sup>
10	Sulfide	ZnS Precipitation, Iodometric Method <sup>(2)</sup>
11	Temperature	Laboratory and Field Method <sup>(2)</sup>
12	Total Dissolved Solids	Dried at 180 °C <sup>(2)</sup>
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>(2)</sup>
14	Total Suspended Solids	Dried at 103-105 °C <sup>(2)</sup>

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method <sup>(5)</sup> 2) Instrumental Analyzer Method <sup>(6)</sup>
2	Sulfur Dioxide	Absorption Sampling, Iodometric Method <sup>(5)</sup>
3	Opacity	Ringelmann's Method <sup>(3,4)</sup>
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>(4)</sup> 2) Instrumental Analyzer Method <sup>(6)</sup>
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup> 2) Instrumental Analyzer Method <sup>(6)</sup>

  
(นางสาววิชุดา สัมฤทธิ์ผล)  
ผู้อำนวยการ  
ศูนย์วิจัยและพัฒนาระบบการตรวจวิเคราะห์โรงงานภาคตะวันออก Sulfuric Acid...


ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method <sup>(4)</sup>
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>(7)</sup>

น้ำได้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method <sup>(2)</sup>
2	pH	Electrometric Method <sup>(2)</sup>
3	Phenols	Distillation, Direct Photometric Method <sup>(2)</sup>

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ผู้อำนวยการ  
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