



ภาคผนวก ง  
เอกสารสอบเทียบเครื่องมือตรวจวัด

เอกสารสอบเทียบเครื่องมือตรวจวัด



Ref No. : 0303/16972

CERTIFICATE OF TESTING LABORATORY ACCREDITATION

This is to certify that

Laboratory of HVE Co., Ltd.  
603 Soi Jarunsanitwong 46, Jarunsanitwong Road,  
Bangyeekhan, Bang Phlat, Bangkok 10700

has successfully undergone assessment according to ISO/IEC 17025 : 2017  
and under the Bureau of Laboratory Accreditation, Department of Science Service  
for the requirements, regulations and criteria for the competence of testing laboratories

LABORATORY ACCREDITATION  
Accreditation Number TESTING - 0090  
BLA-DSS

The scope of accreditation is as annexed hereto

Issue date : 26<sup>th</sup> November 2024

Expired date : 25<sup>th</sup> November 2028

Bureau of Laboratory Accreditation, Department of Science Service,  
Ministry of Higher Education, Science, Research and Innovation

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Reference No. : 0303/16972

Scope of Laboratory Accreditation

Laboratory Name : Laboratory of HVE Co., Ltd.

Address : 603 Soi Jarunsanitwong 46, Jarunsanitwong Road,  
Bangyeekhan, Bang Phlat, Bangkok 10700

Accreditation Number : Testing - 0090

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test Item / Range of Testing      | Test Method / Technique Used   |
|-------------|-------------------------|-----------------------------------|--|
| 1           | Water                   | - pH<br>6.0 to 9.0                | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-H <sup>+</sup> B |
|             |                         | - Copper<br>0.1 mg/L to 1.5 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E        |
|             |                         | - Copper<br>0.03 mg/L to 0.5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E        |

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| Item Number  | Test Material / Product | Test Item / Range of Testing         | Test Method / Technique Used  |
|--------------|-------------------------|--------------------------------------|---|
| 1<br>(cont.) | Water                   | - Manganese<br>0.02 mg/L to 0.4 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E |
|              |                         | - Manganese<br>0.03 mg/L to 0.5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |
|              |                         | - Zinc<br>0.2 mg/L to 0.9 mg/L       | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E |

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|--------------|-------------------------|------------------------------------|---|
| 1<br>(cont.) | Water                   | - Zinc<br>0.03 mg/L to 0.5 mg/L    | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |
|              |                         | - Mercury<br>2 µg/L to 8 µg/L      | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3112 B         |
|              |                         | - Aluminium<br>0.2 mg/L to 10 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 D, 3030 E |

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|--------------|-------------------------|--------------------------------------|--|
| 1<br>(cont.) | Water                   | - Aluminium<br>0.03 mg/L to 0.5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E                                |
|              |                         | - Arsenic<br>2 µg/L to 10 µg/L       | In – house method : WI-LA-049 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3114 C |
|              |                         | - Arsenic<br>0.03 mg/L to 0.5 mg/L   | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E                                |

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| Item Number  | Test Material / Product | Test Item / Range of Testing        | Test Method / Technique Used   |
|--------------|-------------------------|-------------------------------------|--|
| 1<br>(cont.) | Water                   | - Selenium<br>1 µg/L to 10 µg/L     | In – house method : WI-LA-050<br>based on Standard Methods for the<br>Examination of Water and Wastewater,<br>APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 3114 C |
|              |                         | - Selenium<br>0.01 mg/L to 0.1 mg/L | Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 3120 B, 3030 E                                   |
|              |                         | - Barium<br>0.2 mg/L to 1.5 mg/L    | Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 3111 D, 3030 E                                   |

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|--------------|-------------------------|-------------------------------------|---|
| 1<br>(cont.) | Water                   | - Barium<br>0.03 mg/L to 0.5 mg/L   | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |
|              |                         | - Cadmium<br>0.005 mg/L to 0.5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E |
|              |                         | - Cadmium<br>0.001 mg/L to 0.1 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |

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|--------------|-------------------------|-------------------------------------|---|
| 1<br>(cont.) | Water                   | - Chromium<br>0.05 mg/L to 0.9 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E |
|              |                         | - Chromium<br>0.03 mg/L to 0.5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |
|              |                         | - Iron<br>0.05 mg/L to 0.4 mg/L     | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E |

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| Item Number  | Test Material / Product | Test Item / Range of Testing     | Test Method / Technique Used  |
|--------------|-------------------------|----------------------------------|---|
| 1<br>(cont.) | Water                   | - Iron<br>0.03 mg/L to 0.5 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |
|              |                         | - Lead<br>0.02 mg/L to 0.09 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3113 B, 3030 E |
|              |                         | - Lead<br>0.03 mg/L to 0.5 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E |

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| Item Number  | Test Material / Product | Test Item / Range of Testing        | Test Method / Technique Used   |
|--------------|-------------------------|-------------------------------------|--|
| 1<br>(cont.) | Water                   | - Silver<br>0.02 mg/L to 0.45 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3111 B, 3030 E            |
|              |                         | - Silver<br>0.03 mg/L to 0.5 mg/L   | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 E            |
|              |                         | - Cyanide<br>0.05 mg/L to 0.16 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-CN <sup>-</sup> C, E |

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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | - Turbidity<br>1 NTU to 800 NTU<br><br>- Color<br>5 CU to 30 CU<br><br>- Odor<br>Odor or Odorless | In – house method : WI-LA-040<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2130 B<br><br>In – house method : WI-LA-044<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2120 C<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2150 B |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | <p>- Phenol<br/>1 µg/L to 150 µg/L</p> <p>- MBAS<br/>(Calculated as LAS)<br/>0.16 mg/L to 0.3 mg/L</p> <p>- Total solids<br/>dried from 103 °C to 105 °C<br/>85 mg/L to 500 mg/L</p> | <p>In - house method : WI-LA-045<br/>based on Standard Methods for the<br/>Examination of Water and Wastewater,<br/>APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023,<br/>part 5530 C</p> <p>Standard Methods for the Examination<br/>of Water and Wastewater, APHA,<br/>AWWA &amp; WEF, 24<sup>th</sup> ed., 2023,<br/>part 5540 C</p> <p>Standard Methods for the Examination<br/>of Water and Wastewater, APHA,<br/>AWWA &amp; WEF, 24<sup>th</sup> ed., 2023,<br/>part 2540 B</p> |

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| Item Number  | Test Material / Product | Test Item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | - Total hardness<br>(Calculated as CaCO <sub>3</sub> )<br>13 mg/L to 300 mg/L<br><br>- Chloride<br>4.5 mg/L to 150 mg/L<br><br>- Fluoride<br>0.15 mg/L to 1.6 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2340 C<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-Cl <sup>-</sup> B<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-F <sup>-</sup> D |

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| Item Number  | Test Material / Product | Test Item / Range of Testing    | Test Method / Technique Used  |
|--------------|-------------------------|---------------------------------|---|
| 1<br>(cont.) | Water                   | - Nitrate<br>0.2 mg/L to 5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-NO <sub>3</sub> <sup>-</sup> E  |
|              |                         | - Sulfate<br>8 mg/L to 40 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-SO <sub>4</sub> <sup>2-</sup> E |
|              |                         | - Total coliform<br>MPN/100 mL  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 9221 B, C                            |

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|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | - <i>E. coli</i><br>Detected or not detected/100 mL                 | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 9221 B, F                        |
|              |                         | - <i>Clostridium perfringens</i><br>Detected or not detected/100 mL | Standing Committee of Analysts, Methods for the Examination of Waters and Associated Materials, The Microbiology of Drinking Water (2021), Part 6 |
|              |                         | - <i>Salmonella</i> spp.<br>Detected or not detected/100 mL         | ISO 19250 : 2010  |

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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | - <i>Staphylococcus aureus</i><br>Detected or not detected/100 mL       | In - house method : WI-LA-508<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 9213 B |
| 2            | Ice                     | - Chlorine<br>(Calculated as Cl <sub>2</sub> )<br>0.29 mg/L to 1.0 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-Cl B  |
| 3            | Wastewater              | - pH<br>4.0 to 9.0  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-H <sup>+</sup> B                            |

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|--------------|-------------------------|---|---|
| 3<br>(cont.) | Wastewater              | - Total suspended solids<br>dried from 103 °C to 105 °C<br>23 mg/L to 100 mg/L  | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2540 D   |
|              |                         | - Total dissolved solids<br>dried at 180 °C<br>134 mg/L to 500 mg/L             | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2540 C   |
|              |                         | - Total dissolved solids<br>dried from 103 °C to 105 °C<br>132 mg/L to 500 mg/L | In – house method : WI-LA-026<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2540 C |

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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 3<br>(cont.) | Wastewater              | <p>- Settleable solids<br/>0.5 mL/L to 500 mL/L</p> <p>- Sulfide<br/>0.6 mg/L to 2.0 mg/L</p> <p>- Total kjeldahl nitrogen<br/>18 mg/L to 50 mg/L</p> | <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 2540 F</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 4500-S<sup>2-</sup> F</p> <p>In -- house method : WI-LA-012 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 4500-N<sub>org</sub> B</p> |

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Reference No. : 0303/16972

Scope of Laboratory Accreditation

Laboratory Name : Laboratory of HVE Co., Ltd.

Address : 603 Soi Jarunsanitwong 46, Jarunsanitwong Road,  
Bangyeekhan, Bang Phlat, Bangkok 10700

Accreditation Number : Testing - 0090

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing          | Test Method / Technique Used  |
|--------------|-------------------------|---------------------------------------|---|
| 3<br>(cont.) | Wastewater              | - BOD<br>15 mg/L to 500 mg/L          | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 5210 B |
|              |                         | - Oil and grease<br>7 mg/L to 50 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 5520 B |

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| Item<br>Number | Test Material /<br>Product | Test Item /<br>Range of Testing   | Test Method /<br>Technique Used  |
|----------------|----------------------------|---|--|
| 3<br>(cont.)   | Wastewater                 | Pesticide residues<br>Organochlorine group :<br>- $\alpha$ - BHC<br>- Heptachlor<br>- Heptachlor epoxide (Isomer A)<br>- Heptachlor epoxide (Isomer B)<br>- Endosulfan I<br>- Endosulfan II<br>- Aldrin<br>- Dieldrin<br>- Endrin<br>- 4,4'-DDE<br>- 4,4'-DDD<br>Detected or not detected | In - house method : WI-LA-159<br>based on Standard Methods for the<br>Examination of Water and Wastewater,<br>APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 6630 B |

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Accreditation Number : Testing - 0090

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 3<br>(cont.) | Wastewater              | Pesticide residues<br>Pyrethroid group :<br>- Bifenthrin<br>- Lambda-Cyhalothrin<br>- Permethrin<br>- Cyfluthrin<br>- Cypermethrin<br>- Esfenvalerate<br>- Deltamethrin<br>Detected or not detected<br><br>Organophosphorus group :<br>- Chlorthiophos<br>- Chlorpyrifos<br>- Profenofos<br>- Ethion<br>- EPN<br>Detected or not detected | In – house method : WI-LA-159<br>based on Standard Methods for the<br>Examination of Water and Wastewater,<br>APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 6630 B<br><br>In – house method : WI-LA-159<br>based on United States Environmental<br>Protection Agency, 2007, EPA Method<br>8141 B, Revision 2 |

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Accreditation Number : Testing - 0090

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 3<br>(cont.) | Wastewater              | Pesticide residues<br>Carbamate group :<br>- Aldicarb Sulfoxide<br>- Aldicarb Sulfone<br>- Oxamyl<br>- Methomyl<br>- 3-Hydroxy-Carbofuran<br>- Aldicarb<br>Detected or not detected | In – house method : WI-LA-158<br>based on Standard Methods for the<br>Examination of Water and Wastewater,<br>APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 6610 B |

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Reference No. : 0303/16972

Scope of Laboratory Accreditation

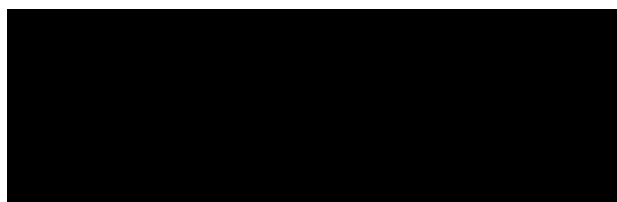
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Accreditation Number : Testing - 0090

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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 3<br>(cont.) | Wastewater              | Pesticide residues<br>Carbamate group :<br>- Propoxur<br>- Carbofuran<br>- Carbaryl<br>- Naphthol<br>- Methiocarb<br>- BDMC<br><br>Detected or not detected | In – house method : WI-LA-158<br>based on Standard Methods for the<br>Examination of Water and Wastewater,<br>APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 6610 B |



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