**National Institute of Metrology (Thailand)**
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# Calibration Fee

## Chemical Metrology and Biometry

| Item No. | Description | TRM code | Range | Accuracy / Uncertainty | Price (THB) | Remark | Code |
|---|---|---|---|---|---|---|---|
| 1 | Piston pipette | | 20 µL to 10 mL | 0.04 µL | 4,000 three point + 500 next point | | 12032-10201 |
| 2 | Volumetric apparatus | | 1 mL to 2000 mL | Class A | 2,500 two point + 500 next point | volumetric flask, pipette, burette, pycnometer | 12032-10203 |
| 3 | recalibrate of referene material for calibration UV/VIS spectrophotometer (Photometric accuracy) | | 20 to 100 mg/kg | 0.003 A | 7,500/set | potassium dichromate solution, neutral density filter | 12032-10301 |
| 4 | recalibrate of referene material for calibration UV/VIS spectrophotometer (Wavelength accuracy) | | 200 nm to 900 nm | 0.3 nm | 5,650/piece | | 12032-10303 |
| 5 | recalibrate of referene material for calibration UV/VIS spectrophotometer (stray light) | | 190 - 280 nm | 0.12 nm | 6,500/set | | 12032-10306 |
| 6 | pH meter with associated electrode | | 1 - 12 pH<br>(-414.11 mV) to 414.11 mV | 0.02 pH<br>0.06 mV | 4,000/set (3 point + 500 next point) | | 12031-10101 |
| 7 | Oxygen Analyzer | | 0.001 -30 cmol/mol | As specification | 11,500/item | 3-point calibration | 12052-10101 |
| 8 | Oxygen Detector | | 18 - 23 cmol/mol | As specification | 3,000/item | 1-point calibration | 12051-10102 |
| 9 | Carbon Dioxide Analyzer | | 0.005-20 cmol/mol | As specification | 11,500/item | 3-point calibration | 12052-10201 |
| 10 | Carbon Dioxide Detector | | 0.005-20 cmol/mol | As specification | 3,000/item | 1-point calibration | 12051-10202 |
| 11 | Methane Analyzer | | 0.005-20 cmol/mol | As specification | 11,500/item | 3-point calibration | 12052-10301 |
| 12 | Methane Detector | | 2.2 -2.5 cmol/mol | As specification | 3,000/item | 1-point calibration | 12051-10302 |
| 13 | Carbon Monoxide Analyzer | | 50 - 65000 µmol/mol | As specification | 11,750/item | 3-point calibration | 12052-10401 |
| 14 | Carbon Monoxide Detector | | 50 - 65000 µmol/mol | As specification | 3,000/item | 1-point calibration | 12051-10402 |
| 15 | Sulfur Dioxide Analyzer | | 30 - 5,000 umol/mol | As specification | 14,500/Item | 3-point calibration | 12050-10501 |
| 16 | Propane Detector | | 0.85 cmol/mol | As specification | 3,000/item | 1-point calibration | 12050-10601 |
| 17 | Nitrogen Monoxide Analyzer | | 30 - 5,000 umol/mol | As specification | 14,500/Item | 3-point calibration | 12050-10701 |
| 18 | Iso-butane Detector | | 0.75 cmol/mol | As specification | 3,000/item | 1-point calibration | 12050-11201 |
| 19 | Multi Gas Detectors for Carbon Monoxide, Methane, Oxygen and Hydrogen Sulfide | | CO: 100 µmol/mol<br>$CH_4$: 2.2 cmol/mol<br>$O_2$ : 18 cmol/mol<br>$H_2S$: 25 µmol/mol | As specification | 6,000/item | 1-point calibration | 12050-11301 |
| 20 | Ammonia Detector | | 50 µmol/mol | As specification | 3,000/item | 1-point calibration | 12050-11401 |
| 21 | Ozone Analyzer | | 0 - 1000 nmol/mol | As specification | 10,500/item | 4-point calibration including zero point | 12050-15201 |

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# RMs/CRMs

## Chemical Metrology and Biometry

| Item No. | Description | TRM code | Range | Accuracy / Uncertainty | Price (THB) | Remark | Code |
|---|---|---|---|---|---|---|---|
| **Standard solution (Code: S)** | | | | | | | |
| 22 | Pork DNA solution | TRM-S-1001 | 100,000 copy number/µL | 6,000 copy number/µL | 5,000 | | 12042-20104 |
| 23 | MON810 plasmid DNA | TRM-S-1002 | 1.04 copy number ratio | 0.061 copy number ratio | 12,500 | | 12042-20101 |
| 24 | TRM-enzyme α-amylase | TRM-S-1003 | 382.8-457.2 U/L | 37.2 U/L | 12,500 | | 12042-20105 |
| 25 | Beef DNA solution | TRM-S-1004 | 102,000 copies/µL | 9,500 copies/µL | 5,000 | | 12042-20107 |
| 26 | Blank papaya DNA solution | TRM-S-1005 | 18861.5 copies/µL | 2348.7 copies/µL | 5,000 | | 12042-20110 |
| 27 | Roundup ready plasmid DNA | TRM -S-1006 | 1.09 copy number ratio | 0.18 copy number ratio | 12,500 | | 12042-20114 |
| 28 | Bt63-Rice plasmid DNA | TRM -S-1007 | 2.3 x $10^4$ copies/µL | 4.7 x $10^3$ copies/µL | 12,500 | | 12042-20115 |
| 29 | Papaya line 55-1 plasmid DNA | TRM -S-1008 | 8.8 x 10^5 copies/µL | 1.8 x10^5 copies/µL | 12,500 | | 12042-20116 |
| 30 | 0.1% (w/w) beef in feed | TRM -F-1010 | 1 g/kg | 0.15 g/kg | 3,500 | | 12042-20117 |
| 31 | 1 % Pork in meatball matrix | TRM -F-1009 | 10.1 g/kg | 1.1 g/kg | 3,500 | | 12042-20118 |
| 32 | Secondary pH standard (tetroxalate) | TRM-S-2002 | 1.66-1.70 pH | 0.006 pH | 8,000/set (5 x 100 mL) | Differential cell method | 12032-20109 |
| 33 | Secondary pH standard (tetroxalate) | TRM-S-2002s | 1.66-1.70 pH | 0.006 pH | 1,700/100 mL | Differential cell method | 12032-20110 |
| 34 | Secondary pH standard (Phthalate) | TRM-S-2003 | 3.990 - 4.020 pH | 0.006 pH | 8,000/set (5 x 100 mL) | Differential cell method | 12032-20101 |
| 35 | Secondary pH standard (Phthalate) | TRM-S-2003s | 3.990 - 4.020 pH | 0.006 pH | 1,700/100 mL | Differential cell method | 12032-20105 |
| 36 | Secondary pH standard (Equipmolal phosphate) | TRM-S-2004 | 6.850 - 6.880 pH | 0.006 pH | 8,000/set (5 x 100 mL) | Differential cell method | 12032-20102 |
| 37 | Secondary pH standard (Equipmolal phosphate) | TRM-S-2004s | 6.850 - 6.880 pH | 0.006 pH | 1,700/100 mL | Differential cell method | 12032-20106 |
| 38 | Secondary pH standard (Tetraborate) | TRM-S-2006 | 9.17 - 9.20 pH | 0.007 pH | 8,000/set (5 x 100 mL) | Differential cell method | 12032-20103 |
| 39 | Secondary pH standard (Tetraborate) | TRM-S-2006s | 9.17 - 9.20 pH | 0.007 pH | 1,700/100 mL | Differential cell method | 12032-20107 |
| 40 | Secondary pH standard (Carbonate) | TRM-S-2007 | 9.99 - 10.02 pH | 0.006 pH | 8,000/set (5 x 100 mL) | Differential cell method | 12032-20104 |
| 41 | Secondary pH standard (Carbonate) | TRM-S-2007s | 9.99 - 10.02 pH | 0.006 pH | 1,700/100 mL | Differential cell method | 12032-20108 |

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|---|---|---|---|---|---|---|---|
| 42 | Potassium Dichromate Solution 1 concentration | TRM-S-2009a | 20, 40, 60, 80 and 100 mg/kg (each set choose from the | 0.01 A | 22,600/set | | 12031-20205 |
| 43 | Potassium Dichromate Solution 2 concentrations | TRM-S-2009b | 20, 40, 60, 80 and 100 mg/kg (each set choose from the | 0.01 A | 27,700/set | | 12031-20204 |
| 44 | Potassium Dichromate Solution 3 concentrations | TRM-S-2009c | 20, 40, 60, 80 and 100 mg/kg (each set choose from the | 0.01 A | 32,800/set | | 12031-20203 |
| 45 | Potassium Dichromate Solution 4 concentrations | TRM-S-2009d | 20, 40, 60, 80 and 100 mg/kg (each set choose from the | 0.01 A | 38,000/set | | 12031-20202 |
| 46 | Potassium Dichromate Solution 5 concentration | TRM-S-2009e | 20, 40, 60, 80 and 100 mg/kg (each set choose from the | 0.01 A | 43,000/set | | 12031-20201 |
| 47 | Potassium Iodide Standard Solution | TRM-S-2010 | 10 g/L | 0.5 nm | 20,000/set | | 12031-20206 |
| 48 | Zinc standard solution | TRM-S-2011 | 10,000 ppm | 1% relative | 1,250/100 ml | | 12031-20301 |
| 49 | Cadmium standard solution | TRM-S-2012 | 10,000 ppm | 1% relative | 1,250/100 ml | | 12031-20302 |
| 50 | Chloride standard solution | TRM-S-2013 | 100 ppm | 1% relative | 1,250/100 ml | | 12031-20401 |
| 51 | Sodium standard solution | TRM-S-2014 | 100 ppm | 1% relative | 1,250/100 ml | | 12031-20501 |
| 52 | Arsenic standard solution | TRM-S-2015 | 1000 ppm | 0.2% rlative | 2,000/100 ml | | 12031-20303 |
| 53 | pH of ethanol | TRM-S-2016 | 6.0 - 8.0 pH | 0.5 pH | 2,500 / bottle | | 12031-20701 |
| 54 | Secondary electrolytic conductivity solution (0.001mol/l KCl) | TRM-S-2017 | 147 µS/cm | 0.5% relative | 5,000/250 ml | | 12031–20603 |
| 55 | Secondary electrolytic conductivity solution (0.1 mol/l KCl) | TRM-S-2018 | 12.88 mS/cm | 0.3% relative | 5,000/250 ml | | 12031-20601 |
| 56 | Secondary electrolytic conductivity solution (0.01mol/l KCl) | TRM-S-2019 | 1413 µS/cm | 0.3% relative | 5,000/250 ml | | 12031-20602 |
| 57 | Secondary electrolytic conductivity solution (nominal 25 µS/cm) | TRM-S-2043 | 25 µS/cm | 1% relative | 5,000 /250 ml | | 12031-20608 |
| 58 | Electrolytic conductivity standard solution (0.001 mol/l KCl) | TRM-S-2044 | 147 µS/cm | 1.5% relative | 2,500/ 250 ml | | 12031-20609 |
| 59 | Electrolytic conductivity standard solution (Nominal 84 µS/cm) | TRM-S-2045 | 84 µS/cm | 2% relative | 2,500/ 250 ml | | 12031-20610 |
| 60 | Electrolytic conductivity standard solution (Nominal 50 µS/cm) | TRM-S-2046 | 50 µS/cm | 2% relative | 2,500/ 250 ml | | 12031-20611 |
| 61 | Primary Phthalate buffer solution | TRM-S-2020 | 3.990 - 4.020 pH | 0.005 pH | 15,000/500 mL | | 12031-20109 |
| 62 | Primary Phosphate buffer solution | TRM-S-2021 | 6.85 - 6.88 pH | 0.005 pH | 15,000/500 mL | | 12031-20110 |
| 63 | Primary Borate buffer solution | TRM-S-2022 | 9.16 - 9.20 pH | 0.005 pH | 15,000/500 mL | | 12031-20111 |
| 64 | electrolytic conductivity of ethanol | TRM-S-2023 | 0.1-1 uS/cm | 5%relative | 2,500/bottle | capacity 50 ml | 12031-20702 |
| 65 | Working pH standard (Phthalate) | TRM-S-2027 | 3.99 - 4.02 pH | 0.01 pH | 1,000/500 mL | | 12031-20121 |

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|---|---|---|---|---|---|---|---|
| 66 | Working pH standard (Equipmolal phosphate) | TRM-S-2028 | 6.85 - 6.88 pH | 0.01 pH | 1,000/500 mL | | 12031-20122 |
| 67 | Working pH standard (Tetraborate) | TRM-S-2029 | 9.17 - 9.20 pH | 0.01 pH | 1,000/500 mL | | 12031-20123 |
| 68 | Primary Carbonate buffer solution | TRM-S-2030 | 9.990 - 10.020 pH | 0.006 pH | 15,000/500 mL | | 12031-20120 |
| 69 | Working pH standard (Carbonate) | TRM-S-2031 | 9.99 - 10.02 pH | 0.01 pH | 1,000/500 mL | | 12031-20124 |
| 70 | Working pH standard (0.01 N Hydrochloric acid) | TRM-S-2032 | 1.08 - 1.12 pH | 0.02 pH | 1,000/500 mL | | 12031-20126 |
| 71 | Working pH standard (Tetroxalate) | TRM-S-2033 | 1.66 - 1.70 pH | 0.01 pH | 1,000/500 mL | | 12031-20127 |
| 72 | Working pH standard (phosphate) | TRM-S-2034 | 6.99 - 7.03 pH | 0.01 pH | 1,000/500 mL | | 12031-20125 |
| 73 | Working pH standard (alkaline phosphate) | TRM-S-2035 | 11.70 - 11.74 pH | 0.01 pH | 1,000/500 mL | | 12031-20128 |
| 74 | Electrolytic conductivity standard solution (0.0001mol/l KCl) | TRM-S-2036 | 84 μS/cm | 1% relative | 5,000/250 ml | | 12031–20604 |
| 75 | Nitrate standard solution | TRM-S-2037 | 100 mg/kg | 1% relative | 1,500 / bottle | | 12031-20402 |
| 76 | Fluoride standard solution | TRM-S-2038 | 1000 mg/kg | 1% relative | 1,500 / bottle | | 12031-20403 |
| 77 | Water content in Ethanol | TRM-S-2039 | 0.1 - 1.0 mg/g | 5% relative | 3,000/5 ampoule | | 12031-20703 |
| 78 | Working electrolytic conductivity solution (0.1 mol/l KCl) | TRM-S-2040 | 12.88 mS/cm | 1.5 %relative | 3,000/250 ml | | 12031-20606 |
| 79 | Working electrolytic conductivity solution (0.01 mol/l KCl) | TRM-S-2041 | 1413 μS/cm | 1.5 %relative | 3,000/250 ml | | 12031-20607 |
| 80 | Electrolytic conductivity standard solution 50 μS/cm | TRM-S-2042 | 50 μS/cm | 1% relative | 5,000/250 ml | | 12031-20605 |
| 81 | 5% Brix Sucrose Standard Solution | TRM-S-5001 | 5.00 % Brix, 1.34026 nD | 0.01 % Brix, 0.00007 nD | 3,600/15 mL | | 12012-20201 |
| 82 | 10% Brix Sucrose Standard Solution | TRM-S-5002 | 10.00 % Brix, 1.34782 nD | 0.01 % Brix, 0.00007 nD | 3,600/15 mL | | 12011-20202 |
| 83 | 20% Brix Sucrose Standard Solution | TRM-S-5003 | 20.00 % Brix, 1.36384 nD | 0.01 % Brix, 0.00007 nD | 3,600/15 mL | | 12011-20203 |
| 84 | 30% Brix Sucrose Standard Solution | TRM-S-5004 | 30.00 % Brix, 1.38115 nD | 0.01 % Brix, 0.00007 nD | 3,600/15 mL | | 12011-20204 |
| 85 | 50% Brix Sucrose Standard Solution | TRM-S-5005 | 50.00 % Brix, 1.42006 nD | 0.01 % Brix, 0.00008 nD | 3,600/15 mL | | 12011-20205 |
| 86 | 60% Brix Sucrose Standard Solution | TRM-S-5006 | 60.00 % Brix, 1.44190 nD | 0.01 % Brix, 0.00007 nD | 3,600/15 mL | | 12011-20206 |
| 87 | Benzene in methanol | TRM-S-5007 | 1,000 mg/L | 1.4 % relative | 4,750/8 mL | | 12011-20207 |
| 88 | Ethylbenzene in methanol | TRM-S-5008 | 1,000 mg/L | 1.1 % relative | 4,750/8 mL | | 12011-20208 |
| 89 | Toluene in methanol | TRM-S-5009 | 1,000 mg/L | 1.4 % relative | 4,750/8 mL | | 12011-20209 |

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|---|---|---|---|---|---|---|---|
| 90 | o-xylene in methanol | TRM-S-5010 | 1,000 mg/L | 2.2 % relative | 4,750/8 mL | | 12011-20210 |
| 91 | m-xylene in methanol | TRM-S-5011 | 1,000 mg/L | 1.0 % relative | 4,750/8 mL | | 12011-20211 |
| 92 | p-xylene in methanol | TRM-S-5012 | 1,000 mg/L | 1.3% relative | 4,750/8 mL | | 12011-20212 |
| 93 | Organochlorine Pesticide Mix set 1 | TRM-S-5013 | 100 mg/kg | 3% relative | 11,600/1.1 mL | | 12011-20213 |
| 94 | Organophosphate Pesticide Mix set 1 | TRM-S-5014 | 100 mg/kg | 5% relative | 7,700/1.1 mL | | 12011-20214 |
| 95 | Organophosphate Pesticide Mix set 2 | TRM-S-5015 | 100 mg/kg | 3% relative | 13,300/1.1 mL | | 12011-20215 |
| 96 | Acaricide Pesticide Mix set 1 | TRM-S-5016 | 100 mg/kg | 3% relative | 7,000/1.1 mL | | 12011-20216 |
| 97 | Carbamate Pesticide Mix set 1 | TRM-S-5017 | 100 mg/kg | 3% relative | 8,100/1.1 mL | | 12011-20217 |
| 98 | Pyrethroid Pesticide Mix set 1 | TRM-S-5018 | 100 mg/kg | 2 % relative | 11,000/1.1 mL | | 12011-20218 |
| 99 | Organophosphate Pesticide Mix set 3 | TRM-S-5019 | 100 mg/kg | 4% relative | 14,500/1.1 mL | | 12011-20219 |
| 100 | Organophosphate Pesticide Mix set 4 | TRM-S-5020 | 100 mg/kg | 4% relative | 11,000/1.1 mL | | 12011-20220 |
| 101 | Organochlorine Pesticide Mix set 2 | TRM-S-5021 | 100 mg/kg | 2% relative | 16,000/1.1 mL | | 12011-20221 |
| 102 | Pyrethroid Pesticide Mix set 2 | TRM-S-5022 | 100 mg/kg | 3 % relative | 10,000/1.1 mL | | 12011-20222 |
| 103 | Organophosphate Pesticide Mix set 5 | TRM-S-5023 | 100 mg/kg | 3% relative | 12,100/1.1 mL | | 12011-20225 |
| 104 | Acaricide Pesticide Mix set 2 | TRM-S-5024 | 100 mg/kg | 2 % relative | 14,000/1.1 mL | | 12011-20224 |
| 105 | Insecticide Pesticide Mix set 1 | TRM-S-5025 | 100 mg/kg | 2 % relative | 10,000/1.1 mL | | 12011-20225 |
| 106 | 0.01% Brix Sucrose Standard Solution | TRM-S-5026 | 0.01% | 2.0% relative | 3,700/ 15mL | | 12011-20226 |
| 107 | 0.02% Brix Sucrose Standard Solution | TRM-S-5027 | 0.02% | 1.4% relative | 3,700/ 15mL | | 12011-20227 |
| 108 | 0.03% Brix Sucrose Standard Solution | TRM-S-5028 | 0.03% | 0.5% relative | 3,700/ 15mL | | 12011-20228 |
| 109 | 0.04% Brix Sucrose Standard Solution | TRM-S-5029 | 0.04% | 0.6% relative | 3,700/ 15mL | | 12011-20229 |
| 110 | 0.05% Brix Sucrose Standard Solution | TRM-S-5030 | 0.05% | 0.8% relative | 3,700/ 15mL | | 12011-20230 |
| 111 | 40% Brix Sucrose Standard Solution | TRM-S-5031 | 40.00% Brix, 1.39986 nD | 0.01 %Brix, 0.00007 nD | 3,600/ 15mL | | 12011-20231 |
| 112 | Sucrose Standard for Optical Measurements | TRM-S-5032 | Purity 997.4 mg/g | 1.1 mg/g | 6,000/bag | | 12011-20101 |
| 113 | Ethanol-Water Standard Solution (0.45 mg/g) | TRM-S-5033 | 0.45 mg/g | 1% Relative | 1,000/bottle | | 12011-20233 |

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|---|---|---|---|---|---|---|---|
| 114 | Ethanol-Water Standard Solution (0.55 mg/g) | TRM-S-5034 | 0.55 mg/g | 1% Relative | 1,000/bottle | | 12011-20234 |
| 115 | Ethanol-Water Standard Solution (1.0 mg/g) | TRM-S-5035 | 1.00 mg/g | 1% Relative | 1,000/bottle | | 12011-20235 |
| 116 | Aflatoxin B1 Standard Solution | TRM-S-5036 | 2.74 µg/g | 4% relative | 3,000/bottle | | 12011-20236 |
| 117 | Aflatoxin B2 Standard Solution | TRM-S-5037 | 2.72 µg/g | 8% relative | 3,000/bottle | | 12011-20237 |
| 118 | Aflatoxin G1 Standard Solution | TRM-S-5038 | 2.87 µg/g | 6 % relative | 3,000 Baht/bottle | | 12011-20238 |
| 119 | Aflatoxin G2 Standard Solution | TRM-S-5039 | 2.69 µg/g | 7 % relative | 3,000 Baht/bottle | | 12011-20239 |
| 120 | Sodium Chloride Standard Solution | TRM-S-5040A, TRM-S-5040B, | 0.30 g/100g, 5.84 g/100 g, | 2% relative | 1,500 Baht/bottle | | 12011-20240 |
| 121 | Pesticide Standard Solution (Custom-made) | TRM-S-5042 | 100 mg/kg | 2-5% relative | 10,000-60,000/ 5 Ampoules x 1 mL | | 12011-20242 |
| 122 | Platinum electrode for pH measurement | | | | 25,000 /piece (1,000 USD) | For differential cell and Harned cell method | 12031-20801 |
| **Food (Code: F)** | | | | | | | |
| 123 | Pure pork meat | TRM-F-1001 | 1000 g/kg | | 3,500 | | 12042-20102 |
| 124 | Pure beef meat | TRM-F-1002 | >998.8 g/kg | | 3,500 | | 12042-20103 |
| 125 | Blank soybean GTS 40-3-2 matrix | TRM-F-1003 | <0.2 g/kg | N/A | 3,500 | | 12042-20106 |
| 126 | 1% Pork in beef matrix | TRM-F-1004 | 10 g/kg | 2.20 g/kg | 3,500 | | 12042-20108 |
| 127 | 10% Pork in beef matrix | TRM-F-1005 | 100 g/kg | 11 g/kg | 3,500 | | 12042-20109 |
| 128 | Blank meatball matrix | TRM-F-1006 | 1 000g/kg | N/A | 3,500 | | 12042-20111 |
| 129 | 0.1% Pork in beef matrix | TRM-F-1007 | 1 g/kg | 0.33 g/kg | 3,500 | | 12042-20112 |
| 130 | 1% beef in feed matrix | TRM-F-1008 | 10 g/kg | 0.1 g/kg | 3,500 | | 12042-20113 |
| 131 | Trace and Essential Elements in Prawn ปริมาณธาตุในกุ้ง | TRM-F-2002 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 2,000/ bottle | 5 g/bottle | 12022-20002 |
| 132 | Arsenic in White Rice Flour ปริมาณสารหนูในผงข้าวขาว | TRM-F-2003 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 4,000/bottle | 25 g/bottle | 12022-20007 |
| 133 | Elements and MeHg in Tuna Tissue | TRM-F-2004 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 4,000/bottle | 20 g/bottle | 12022-20010 |

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|---|---|---|---|---|---|---|---|
| 134 | Total malachite green in shrimp | TRM-F-5001 | 18.35 µg/kg | 4.00 % relative | 5,000/ bottle | | 12011-20601 |
| 135 | Aflatoxins in peanut butter | TRM-F-5002 | 2-10 ng/g | 8-10% relative | 4,500 /bottle | 30 g/bottle | 12011-20602 |
| 136 | Melamine in cracker | TRM-F-5003 | 1.56 mg/kg | 9% relative | 3,000/bottle | | 12011-20603 |
| 137 | Clenbuterol in feed | TRM-F-5004 | 71.9 µg/kg | 5.43 % relative | 2,850/bottle | | 12011-20901 |
| 138 | Salbutamol in feed | TRM-F-5005 | 79.5 µg/kg | 14.21 % relative | 2,850/bottle | | 12011-20902 |
| 139 | Melamine in Milk Powder | TRM-F-5006 | 1.03 mg/kg | 16% relative | 3,000/20g bottle | | 12011-20604 |
| 140 | Fatty Acid in Cooking Oil | TRM-F-5007 | Palmitic acid 106 mg/g,11.4%<br>Stearic acid 33 mg/g, 4.1%<br>Oleic acid 231 mg/g, 25.7% | 7-10% relative | 6000/bottle | | 12011-20605 |
| 141 | Organophosphates pesticides in rice flour | TRM-F-5008 | Diazinon 15 ng/g<br>Chlopyrifos 18 ng/g | 6-8% relative | 4000/bottle | 30g/bottle | 12011-60606 |
| **Environment (Code: E)** | | | | | | | |
| 142 | Trace Elements in Water ปริมาณธาตุในน้ำ | TRM-E-2002 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 2,000/bottle | 100 mL/bottle | 12022-20008 |
| 143 | Mercury in Water ปริมาณปรอทในน้ำ | TRM-E-2003 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 1,700/bottle | 10 mL/bottle | 12022-20009 |
| 144 | Oxygen in Nitrogen | TRM-E-3010 | 5-30 cmol/mol | 0.25 %relative | 29,000/refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12051-20101 |
| 145 | Oxygen in Nitrogen | TRM-E-3011 | 5-30 cmol/mol | 0.5 %relative | 18,000/refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12051-20103 |
| 146 | Oxygen in Nitrogen | TRM-E-3012 | 100 µmol/mol -5 cmol/mol | 1.0 %relative | 25,400/refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12050-20109 |
| 147 | Oxygen in Nitrogen | TRM-E-3013 | 10 - 100 µmol/mol | 2.0 %relative | 25,400/refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12051-20111 |
| 148 | Carbon Dioxide in Nitrogen | TRM-E-3020 | 0.005-20 cmol/mol | 0.5 %relative | 30,000 refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12050-20201 |
| 149 | Carbon Dioxide in Nitrogen | TRM-E-3021 | 0.005-20 cmol/mol | 1.0 %relative | 20,000 refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-120 bar<br>CGA Valve: 580 | 12052-20203 |

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| Item No. | Description | TRM code | Range | Accuracy / Uncertainty | Price (THB) | Remark | Code |
|---|---|---|---|---|---|---|---|
| 150 | Methane in Nitrogen | TRM-E-3030 | 0.005-50 cmol/mol | 0.5%relative | 30,000 refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12052-20301 |
| 151 | Methane in Nitrogen | TRM-E-3031 | 0.005-50 cmol/mol | 1.0%relative | 20,000 refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12052-20303 |
| 152 | Methane in Air | TRM-E-3032 | 0.05-2.5 cmol/mol | 1.0 %relative | 24,100/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12050-20305 |
| 153 | Carbon Monoxide in Air | TRM-E-3040 | 50 - 65000 µmol/mol | 1.0 %relative | 24,100/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12050-20401 |
| 154 | Carbon Monoxide in Nitrogen | TRM-E-3041 | 5 - 200 000 µmol/mol | 1.0 - 2.0 %relative | 20,000/refill per 1 cylinder | Cylinder Volume: approx. 10 Liters Filling Pressure: 100-120 bar | 12050-20403 |
| 155 | Sulfur Dioxide in Nitrogen | TRM-E-3050 | 100 -5 000 µmol/mol | 1.0% relative | 23,000/refill per cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12050-20501 |
| 156 | Sulfur Dioxide in Nitrogen | TRM-E-3051 | 30 - 100 µmol/mol | 2% relative | 23,000/refill per cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12050-20503 |
| 157 | Propane in Nitrogen | TRM-E-3060 | 0.001- 1 cmol/mol | 0.7% relative | 31,000/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12051-20601 |
| 158 | Propane in Nitrogen | TRM-E-3061 | 0.001- 1 cmol/mol | 1.0 %relative | 20,500 refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12051-20603 |
| 159 | Propane in Air | TRM-E-3062 | 0.5-1 cmol/mol | 1.0 %relative | 24,100/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 580 | 12050-20605 |
| 160 | Nitrogen Monoxide in Nitrogen | TRM-E-3070 | 100 - 5 000 µmol/mol | 1.0% relative | 23,000/refill per cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 660 | 12050-20701 |
| 161 | Nitrogen Monoxide in Nitrogen | TRM-E-3071 | 30 - 100 µmol/mol | 2% relative | 23,000/refill per cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar CGA Valve: 660 | 12050-20703 |
| 162 | Oxygen, Carbon monoxide and Methane in Nitrogen | TRM-E-3100 | $O_2$ : 18 cmol/mol $CH_4$: 2.2-2.5 cmol/mol | 1.0 %relative | 30,000/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12050-21001 |
| 163 | Hydrogen Sulfide in Nitrogen | TRM-E-3110 | 20 - 100 µmol/mol | 4% relative | 25,500/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12050-21101 |
| 164 | Iso-butane in Air | TRM-E-3120 | 0.1- 1 cmol/mol | 1% relative | 24,500/refill per 1 cylinder | Cylinder volume: 10 Liters, Filling Pressure :100-120 bar | 12050-21201 |
| 165 | Oxygen, Carbon monoxide, Methane and Hydrogen sulfide in Nitrogen | TRM-E-3130 | $O_2$ : 18 cmol/mol $CH_4$: 2.2 cmol/mol | 1.0 %relative for $O_2$, $CH_4$, CO | 35,000/refill per 1 cylinder | Cylinder Volume: approx. 10 Liters | 12050-21301 |
| 166 | Ammonia in Nitrogen | TRM-E-3140 | 20-100 µmol/mol | 4.0 %relative | 25,500/refill per 1 cylinder | Cylinder Volume: approx. 10 Liters | 12050-21401 |
| 167 | Hydrogen in Nitrogen | TRM-E-3150 | 100 - 20 000 µmol/mol | 1.0 %relative | 20,000/refill per 1 cylinder | Cylinder Volume: approx. 10 Liters | 12050-21501 |
| 168 | Organochlorine Pesticides in Soil | TRM-E-5001 | Endosulfan II 0.43 mg/kg Endosulfan sulfat 0.56 mg/kg | 14% Relative 15% Relative | 3,000/bottle | | 12011-20801 |

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| Item No. | Description | TRM code | Range | Accuracy / Uncertainty | Price (THB) | Remark | Code |
|---|---|---|---|---|---|---|---|
| **Material (Code: M)** | | | | | | | |
| 169 | Elements in Acrylonitrile Butadiene Styrene (ABS) Plastic, Low Levels ปริมาณธาตุระดับต่ำในพลาสติกชนิด ABS | TRM-M-2001 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 5,000/ bottle | 30 g/bottle | 12022-20003 |
| **Clinical (Code: C)** | | | | | | | |
| 170 | Elements in Human Serum ปริมาณธาตุในซีรั่ม | TRM-C-2001 | see certificate โปรดดูรายละเอียดในตัวอย่างใบ Certificate | | 1,000/bottle | 4 mL/bottle | 12022-20006 |
| 171 | Ethanol in Air | TRM-C-3090 | 50 - 200 µmol/mol | 1.0 %relative | 35,000/refill per 1 cylinder | Cylinder volume: 10 Liters,<br>Filling Pressure :100-110 bar<br>CGA Valve: 580 | 12050-20901 |

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# Analysis Fee

## Chemical Metrology and Biometry

| Item No. | Description | TRM code | Range | Accuracy / Uncertainty | Price (THB) | Remark | Code |
|---|---|---|---|---|---|---|---|
| 172 | Determination of organic compounds in biological fluid by IDMS | | ng/g - mg/g | 2 - 12 %relative | 15,000/sample | | 12012-60501 |
| 173 | Determination of organic contaminants in food and feed by IDMS | | ng/g - µg/g | 0.1 - 9 %relative | 20,000/sample | | 12012-60601 |
| 174 | Determination of contaminants in food and feed by calibration curve | | ng/g - µg/g | | 10,000 /analyte + 5,000 for next analyte | | 12012-60602 |
| 175 | Determination of purity of organic compounds (Mass balance method) | | as specification | as specification | 19,000/sample | | 12012-60101 |
| 176 | Determination of purity of organic compounds (specified technique) | | as specicication | as specification | 2,000-10,000.00/sample | | 12012-60102 |
| 177 | Determination of organic compounds in botanical products | | ug/g - mg/g | 3-20% relative | 3,000 - 5,000/sample | | 12012-60901 |
| 178 | Determination of ethanol in Food and beverages by HS-GC-FID | | 0.05-5 mg/g | 1.4-1.5% relative | 10,000/sample | | 12012-60603 |
| 179 | Determination of fatty acid and trans fatty acid in food (Fat and oil) | | 1- 1000 mg/g | 7 - 8 %relative | 12,000/sample | | 12012-60604 |
| 180 | Determination of Brix and refractive indices in food and beverages by refractometer | | 5 - 60 %Brix<br>1.34026 - 1.44193 nD | 0.04 %Brix<br>0.00008 nD | 1,500/sample | | 12012-60201 |
| 181 | Determination of polarization in food and beverages by polarimeter | | 0 - 100 °Z<br>0 - 40 OR | 0.3 - 0.6 °Z<br>1 - 3 OR | 11,000/sample | | 12012-60202 |
| 182 | Determination of Aflatoxins in solution by LC | | ng/g - mg/g | 3 - 10 %relative | 6,000/analyte +3,000 for next analyte | | 12012-60203 |
| 183 | Determination of sodium chloride by refractometry | | 0-25 g/100g | 1.72 % relative | 6,000/sample | calibration curve | 12012-60204 |
| 184 | Determination of amylose in rice by size exclusion chromatography (SEC) technique | | 0-30% | as specification | 6,000/sample | | 12012-60302 |
| 185 | Determination of amylose in rice by Iodine binding assay using a plate reader | | 0-30% | as specification | 6,000/sample | | 12012-60303 |
| 186 | Determination of dietary suppliment adulteration in food | | 100-1000 ng/g | 7-8 % relative | 18000/sample | Exact-matching IDMS | 12012-60304 |
| 187 | Assigned pH value for sample (primary method) | | 1 - 12 pH | 0.003 pH | 13,750/sample | | 12033-60107 |
| 188 | Assigned pH value for sample (secondary method) | | 1 - 12 pH | 0.004 pH | 13,000/sample | | 12033 - 60109 |
| 189 | Assigned pH value for sample (working method) | | 1 - 12 pH | 0.01 pH | 2,500/sample | | 12033-60106 |
| 190 | Assigned electrolytic conductivity value for sample (secondary method) | | 5 µS/cm - 12.88 mS/cm | 0.3% - 1% relative | 11,000 /sample | | 12033-60404 |
| 191 | Assigned electrolytic conductivity value for sample (commercial cell) | | 84 - 12880 µS/cm | 0.8% - 1.3% relative | 2,500/sample | | 12033-60406 |
| 192 | Determination of cation and anion in sample | | 0.5 -50 mg/kg | 2%relative | 7,000/sample | | 12033-60103 |
| 193 | Determination of Elements in sample by ID-ICP/MS | | 0.0001-30000 mg/kg | 1-8%relative | 20,000 for first element + 3000 for next element | | 12023-60101 |
| 194 | Determination of Elements in sample by gravimetric standard addition | | 0.00095-20000 mg/kg | 2-18 %relative | 17,500 for first element + 3000 for next element | | 12023-60102 |
| 195 | Determination of Elements in sample by external calibration | | 0.000002 - 25000 mg/kg | 2.5-16%relative | 10,000 for first element + 3000 for next element | | 12023-60103 |

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|---|---|---|---|---|---|---|
| 196 | Determination of Elemental speciation in sample | 0.005 - 20 mg/kg | 3.5-10%relative | 17,500 for first specy + 3000 for next species | | 12023-60104 |
| 197 | Catalytic activity concentration of enzyme by microplate reader | U/L | U/L | 6,000/sample | | 12043-60101 |
| 198 | Qualification/quantification of DNA concentration in Foodstuffs/Feed/Biomarkers by droplet digital Polymerase Chain Reaction (ddPCR) | detection or not detection/ copy number or ratio | | 12,500/sample | | 12043-60102 |
| 199 | DNA Quantification in Foodstuffs and feed by quantitative real-time PCR (qPCR) | copy number or ratio | | 8,500/sample | | 12043-60103 |
| 200 | DNA Qualification in Foodstuffs/Feed/Biomarkers quantitative by real-time PCR (qPCR) | detection or not detection | | 5,000/sample | | 12043-60104 |
| 201 | Identification of biomolecules by MALDI-TOF MS | Quality measurement | Quality measurement | 2,000/sample | | 12043-60105 |
| 202 | qualification of protein in Foodstuffs and feed by LC Q-TOF MS | detection or not detection | | 3,500/sample | | 12043-60106 |
| 203 | Confocal Laser Scanning Microscopes ZEISS LSM880 | Cell imaging | Cell imaging | 2,500/hr | | 12043-60107 |
| 204 | Nanoparticle size measurement in solution | 10 - 1000 nm | | 2,000/sample | | 12043-60108 |
| 205 | Identification and quantification of organic compounds in herb by GC-MS and HPLC | Quality measurement / Quantity measurement | Quality measurement / Quantity measurement | 2,000/sample | | 12043-60109 |
| 206 | Detection of Foodstuffs/Feed/Biomarkers using loop-mediated isothermal amplification | detection or not detection | | 2,750/sample | | 12043-60110 |
| 207 | Oxygen in Nitrogen | 5-30 cmol/mol | 0.25%relative | 23,000/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60101 |
| | | 0.01 -5 cmol/mol | 0.7%relative | 30,500/cylinder | Cylinder Volume: approx. 10 Liters | 12050-60102 |
| | | 10-100 µmol/mol | 1.2%relative | 30,500/cylinder | Cylinder Volume: approx. 10 Liters | 12050-60103 |
| 208 | Carbon Dioxide in Nitrogen | 0.05-20 cmol/mol | 0.5%relative | 24,000/cylinder | Cylinder Volume: approx. 10 Liters | 12054-60201 |
| 209 | Methane in Nitrogen | 0.05-50 cmol/mol | 0.5%relative | 24,000/cylinder | Cylinder Volume: approx. 10 Liters | 12053-60301 |
| 210 | Carbon Monoxide in Nitrogen | 5-100 µmol/mol | 1.0%relative | 24,000/cylinder | Cylinder Volume: approx. 10 Liters | 12052-60401 |
| | | 0.005 - 20 cmol/mol | 0.5%relative | 24,000/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60402 |
| 211 | Sulfur Dioxide in Nitrogen | 100 -5 000 µmol/mol | 0.7%relative | 27,600/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60501 |
| 212 | Sulfur Dioxide in Nitrogen | 30 - 100 µmol/mol | 1.2% relative | 27,600/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60502 |
| 213 | Propane in Nitrogen | 0.001- 1 cmol/mol | 0.7%relative | 24,000/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60601 |
| 214 | Nitrogen Monoxide in Nitrogen | 50 - 5 000 µmol/mol | 0.7%relative | 27,600/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60701 |
| 215 | Nitrous Oxide in Nitrogen | 0.05-10 cmol/mol | 0.7%relative | 27,600/cylinder | Cylinder Volume: approx. 10 Liters | 12051-60801 |
| 216 | Carbon monoxide, Carbon dioxide in Nitrogen | 1-15 cmol/mol | 0.5%relative | 28,800/cylinder | Cylinder Volume: approx. 10 Liters | 12051-61001 |

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|---|---|---|---|---|---|---|---|
| 217 | Hydrogen Sulfide in Nitrogen | | 25 - 100 µmol/mol | 2.5% relative | 30,600/cylinder | Cylinder Volume: approx. 10 Liters | 12051-61101 |
| 218 | Ammonia in Nitrogen | | 20-100 µmol/mol | ≥2.5 %relative | 30,600/ cylinder | Cylinder Volume: approx. 10 Liters | 12050-61401 |
| 219 | Hydrogen in Nitrogen | | 100 - 20 000 µmol/mol | ≥0.5 %relative | 30,500/cylinder | Cylinder Volume: approx. 10 Liters | 12050-61501 |
| 220 | Nitrogen Dioxide in Nitrogen | | 100 - 3 000 umol/mol | 2% relative | 27,600/cylinder | Cylinder Volume: approx. 10 Liters | 12050-61701 |
| 221 | Particulate Matter as $PM_{2.5}$, $PM_{10}$ (Analysis) | | 0 - 500 µg/m3 | As air volume specification (≥2.0 %relative) | 2,700/3 filter samples-47mm | By gravimetric analyis of filter sample | 12051-65001 |
| 222 | Organic and Elemental Carbon (OC/EC) in Particulate Matter | | 0 - 200 µg $C/m^3$ | As air volume specification (≥2.0 %relative) | 2,100/3 filter samples | By thermal-optical analyis of filter sample | 12051-65101 |
| 223 | Purity assessment of high purity nitrogen<br>Measurand: $O_2$, CO, $CO_2$, $CH_4$, Ar, $H_2O$ | | 0.1-100 µmol/mol | 2-30%relative | 16,000/cylinder | | 12050-66001 |
| 224 | Purity assessment of high purity oxygen<br>Measurand: $N_2$, CO, $CO_2$, $CH_4$, Ar, $H_2O$ | | 0.1-100 µmol/mol | 2-30%relative | 18,000/cylinder | | 12050-66101 |
| 225 | Purity assessment of high purity carbon monoxide<br>Measurand: $O_2$, $N_2$, $CO_2$, $CH_4$, $H_2O$ | | 0.1-100 µmol/mol | 2-30%relative | 13,000/cylinder | | 12050-66201 |
| 226 | Purity assessment of high purity methane<br>Measurand: $O_2$, CO, $CO_2$, THC, $H_2O$ | | 0.1-100 µmol/mol | 2-30%relative | 13,000/cylinder | | 12050-66301 |