National Institute of Metrology (Thailand)
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Price List

Calibration Fee

Mechanical Metrology

Item No.	Description	Range	Accuracy / Uncertainty	Price (THB)	Remark	Code
1	Mass Standard	1 kg	0.038 mg (Class E0)	18,750/piece	Comparison in air	10011 - 10001
2	Mass Standard	1 mg to 1 kg	Class E1	4,500/piece	Mass and Conventional mass	10011 - 10101
		2 kg		5,070/piece		10011 - 10102
		5 kg		5,630/piece		10011 - 10103
		10 kg		5,940/piece		10011 - 10104
		20 kg		6,250/piece		10011 - 10105
	Mass Standard set	1 mg to 10 mg		22,500/set		10011 - 10101
		20 mg to 100 mg		18,000/set		
		200 mg to 1 g		18,000/set		
		2 g to 10 g		18,000/set		
		20 g to 100 g		18,000/set		
		200 g to 1 kg		18,000/set		
		2 kg to 10 kg		21,710/set		10011 - 10104
3	Mass Standard or Mass Standard set	1 mg to 1 kg	Class E2	2,050/piece	Conventional mass	10011 - 10201
		2 kg		2,750/piece		10011 - 10202
		5 kg		2,750/piece		10011 - 10203
		10 kg		3,130/piece		10011 - 10204
		20 kg		3,940/piece		10011 - 10205
		50 kg		8,000/piece		10011 - 10206
		1 mg to 1 kg	Class F1 and lower	1,690/piece		10011 - 10301
		2 kg		2,250/piece		10011 - 10302
		5 kg		2,750/piece		10011 - 10303
		10 kg		2,750/piece		10011 - 10304
		20 kg		3,130/piece		10011 - 10305
		50 kg		6,250/piece		10011 - 10306
		100 kg		10,170/piece		10011 - 10307
		200 kg		15,000/piece		10011 - 10308
		500 kg		15,000/piece		10011 - 10401
		1000 kg	Class F2 and lower	16,250/piece		10011 - 10402
		2000 kg	Class M1 and lower	20,000/piece		10011 - 10501
4	Volume magnetic susceptibility of weight	1 g to 20 kg	In the range of 10% to 20% of magnetic polarization	2,820/piece	By the susceptometer method	10012 - 10101
5	Permanent magnetization of weight (including magnetic susceptibility)	0.005 µT - 2.5 µT	0.5 µT	5,000/piece	By the susceptometer method (Nominal weight range 1 g to 20 kg)	10012 - 10102
		2.5 µT - 120 µT	In the range of 10% to 20% of magnetic polarization			
6	Permanent magnetization of weight	0 µT - 250 µT	10 µT + 0.03 μ_0M μ_0M = Permanent magnetization µT	1,250/piece	By gaussmeter (Nominal weight range 1 g to 20 kg)	10012 - 10103

Effective date
5 October 2022

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7	Surface roughness (Ra,Rz) of weight	Up to 50 µm	$Ra=\sqrt{(7.490)^2+(1.021\cdot Z_m)^2}$ $Rz=\sqrt{(110.116)^2+(1.422\cdot Z_m)^2}$ where Z_m (unit nm) being measured value of weight	7,500/piece	Nominal weight range 1 g to 1 kg	10013 - 10101
8	Inter-laboratory comparison on mass measurement; - Non Automatic Weighing Instruments (NAWI), Electonic balance"	Single range, Resolution 0.001 mg, Maximum capacity 21 g, Number of scale interval 21,000,000	NIMT.M.M-09	5,000	-	10014-10101
9	Inter-laboratory comparison on mass measurement;	1000 kg	NIMT.M.M-12	20,250	Conventional mass	10014-10102
	- Mass Standard	200 g , 1 kg and 20 kg	NIMT.M.M-13	9,830	Conventional mass (200 g ,1 kg- F2 Class and 20 kg-M1 Class)	10014-10103
	- Mass Standard	100 mg, 100 g, and 1 kg	NIMT.M.M-F1.01/2020	5,000	Conventional mass (100 mg, 100 g, and 1 kg- F1 Class)	10014-10104
10	Density and volume of weight (1 g to 20 kg)	1 g	120 kg m^{-3}, 0.002 cm^3	3,920/piece	Any class which no cavity by hydrostatic weighing method	10021 - 10101
		2 g	60 kg m^{-3}, 0.002 cm^3			
		5 g	20 kg m^{-3}, 0.002 cm^3			
		10 g	15 kg m^{-3}, 0.002 cm^3			
		20 g	10 kg m^{-3}, 0.004 cm^3			
		50 g	5.6 kg m^{-3}, 0.004 cm^3			
		100 g	4.4 kg m^{-3}, 0.004 cm^3			
		200 g	3.8 kg m^{-3}, 0.007 cm^3			
		500 g	2.7 kg m^{-3}, 0.018 cm^3			
		1 kg	2.6 kg m^{-3}, 0.036 cm^3			
		2 kg	6.8 kg m^{-3}, 0.21 cm^3			
		5 kg	3.3 kg m^{-3}, 0.25 cm^3			
		10 kg	2.4 kg m^{-3}, 0.4 cm^3			
		20 kg	2 kg m^{-3}, 0.7 cm^3			
11	Density and volume of solid artifact	2700 kg m^{-3} to 9000 kg m^{-3} 1.25 cm^3 to 110 cm^3	$6/V^{0.8}$ kg m^{-3} $(0.04123V+0.4592)$ mm^3 V = volume cm^3	8,750/piece	Hydrostatic weighing method (Traceable to a solid density standard)	10021 - 10102
12	Hydrometer - Density	600 to 2000 kg m^{-3}	$3.22\times10^{-5}\,d + 0.0207$ kg m^{-3} หรือเทียบเท่าในหน่วยอื่น d = density kg m^{-3}	7,040/3 points + 1250 next point	Hydrostatic weighing method (Cuckow method)	10021 - 10301
	- Specific Gravity - API - Brix - Brumé		0.25 kg m^{-3} 0.00010 sp/gr 0.030 °API 0.30 °Brix 0.030 Bé	4,230/3 points + 1250 next point		10021 - 10302

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	- Alcoholometer		0.10 %vol			
13	Density of liquid	600 to 1500 kg m^{-3}	0.1 to 2.0 kg m^{-3}	6,750/piece	By hydrostatic weighing method	10021 - 10401
14	Density of liquid	700 to 1600 kg m^{-3}	0.10 kg m^{-3}	1,250/piece	By oscillation-type density meter	10021 - 10402
15	Density Meter, Benchtop & Portable Oscillation Type	650 to 1000 kg m^{-3}	0.020 kg m^{-3}	22,000/piece	By direct comparison with reference fluids in accordance with ISO 15212	10021 - 10501
		1000 to 1600 kg m^{-3}	0.030 kg m^{-3}			
16	Inter-laboratory comparison on density measurement - Artifact: Hydrometer	9 - 81 °API 640 – 1320 kg m^{-3}	NIMT.M.D-01/2018	5,000		10021 - 10601
17	CRM - Density of Water : 20 Litres @ 20°C	998.20 kg m^{-3}	1.00 kg m^{-3}	500/piece		10021 - 10701
18	CRM - Density of Water : 20 ml @ 20°C	998.20 kg m^{-3}	1.00 kg m^{-3}	300/piece		10021 - 10702
19	Force-proving instrument	1 kN to 110* kN	ISO 376:2011, 0.0020 %	14,540/direction	Calibrated by deadweight force	10030 - 10101
		0.1 kN to 1.5 kN	ISO 376:2011, 0.0050 %	12,670/direction	standard machine.	10030 - 10102
		0.2 kN to 5 kN	ISO 376:2011, 0.0050 %	12,670/direction	Digital indicator shall be provided by	10030 - 10103
		16 kN to 500 kN	ISO 376:2011, 0.0080 %	21,100/direction	customer.	10030 - 10104
		50 N to 500 N	ISO 376:2011, 0.0040 %	7,500/direction		10030 - 10105
		10 N to 200 N	ISO 376:2011, 0.0040%	7,500/direction		10030 - 10106
		20 kN to 100 kN	Accroding to ISO 376:2011 Class 0.5 to 2	10,000/direction	Calibrated by force-comparator machine.	10030 - 10201
		> 100 kN to 500 kN		13,290/direction	Digital indicator shall be provided by customer.	10030 - 10202
20	Strain Amplifier	± 2.0 mV/V	2.5 x 10-5 mV/V	3,750/range	Calibrated by Bridge Calibration Unit	10030 - 10401
	(Digital Measurement Amplifier)	± 5.0 mV/V	3.0 x 10-4 mV/V	3,750/range		
21	Static Torque Measuring Devices (Torque Transducer)	0.1 N·m to 1 N·m 1 N·m to 10 N·m 10 N·m to 1,000 N·m	DIN 51309, 0.015% DIN 51309, 0.01%, 0.03% DIN 51309, 0.01%	10,500/range		10040 - 10101
		100 N·m to 5,000 N·m	DIN 51309, 0.01%	21,000/range		10040 - 10102
22	Static Torque Transfer Wrenches	1 N·m to 10 N·m 10 N·m to 2,000 N·m	DAkkS-DKD-R 3-7, 0.04% DAkkS-DKD-R 3-7, 0.03%	10,500/range		10040 - 10202
23	Static Torque Calibration Devices - Torque Wrench Calibration Devices	1 N·m to 2,000 N·m	DAkkS-DKD-R 3-8 0.2%	5,250/range		10040 - 10303
			กมว. 1 - 2560 0.2%	4,200/range		10040 - 10304
	- Torque Screwdriver Calibration Devices	0.1 N·m to 1 N·m	Based on DAkkS-DKD-R 3-8, 0.3%	5,250/range		10040 - 10305
		1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 0.2%	5,250/range		10040 - 10302

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24	Hand Torque Tools (Type I and Type II)					
	- Wrench	1 N·m to 1,000 N·m	ISO 6789, 1%	3,500/range		10040 - 10401
	- Screwdriver	0.1 N·m to 1 N·m	ISO 6789, 1.5%	3,500/range		10040 - 10402
		1 N·m to 10 N·m	ISO 6789, 1%	3,500/range		
25	Torque multiplier	340 N·m to 2,700 N·m	Based on ISO 6789 : 2003(E), 1.5%	7,500/range		10040 - 10501
26	Adjustment charge of torque device for permanent laboratory calibration			100% of the calibration cost of each item and each range		10040 - 10601
27	Recalibration of Reference Block	20 HRA to 95 HRA	0.40 HRA	5,250/piece	Reference Block shall be provided	
	Rockwell Scale : HRA, HRB, HRC	10 HRBW to 100 HRBW	0.40 HRBW		by client.	10050 - 10101
		20 HRC to 70 HRC	0.40 HRC			
	Rockwell Scale : HR30TW	29 HR30TW to 82 HR30TW	0.35 HR30TW	7,500/piece		
	Vickers : HV according to ISO 6508-3	HV 5, HV 10, HV 20, HV 30, HV 50, HV 100	$\left(2.1+\frac{2600}{d^2}\right)$ % of HV	5,820/piece		10050 - 10201
	Vickers : HV according to ISO 6508-3	HV 0.1	$\sqrt{6.5+\frac{16500}{d^2}}$ % of HV	5,820/piece		10050 - 10501
	Vickers : HV **According to ASTM E92	HV 20	$\sqrt{7.9+\frac{70000}{d^2}}$ % of HV for d > 180 µm $\sqrt{6.5+\frac{16500}{d^2}}$ % of HV for d ≤ 180µm	14,000/piece		10050-10206
	Brinell Scale: HB	HBW 5/750	1.2% of HBW for Force 7.355 kN (750 kgf)	5,000/piece		
		HBW 10/500	1.2% of HBW for Force 4.903 kN (500 kgf)			
		HBW 10/3000	0.6% of HBW for Force 29.42 kN (3,000 kgf)	6,250/piece		10050 - 10401
28	Elastomer Hardness Testing Machine	IRHD-N IRHD Pocket IRHD-M Durometer Type A Durometer Type D Durometer Type AO	According to ISO48-9, ASTM D2240, JIS K6253, JIS K7215, JIS K6301, DIN 53505	6,850/machine		10050 - 10302
		Durometer Type C	ASTM D2240			
29	Gas Pressure Balances	Up to 7 MPa	> $5x10^{-4}$ x Pe to $1x10^{-4}$ x Pe	50,000	1. Price per 1 piston & cylinder assembly 2. Calibration of weight set is included.	10060 - 10101
			< $1x10^{-4}$ x Pe	50,000		10060 - 10102
		>7 MPa to 40 MPa	> $5x10^{-4}$ x Pe	55,000		10060 - 10103
			$5x10^{-4}$ x Pe to $1x10^{-4}$ x Pe	55,000		10060 - 10104
			< $1x10^{-4}$ x Pe	55,000		10060 - 10105

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30	Hydraulic Pressure Balances	Up to 200 MPa	> 5x10-4 x Pe to 1x10-4 x Pe	50,000	1. Price per 1 piston &	10060 - 10201
			< $1x10^{-4}$ x Pe	50,000	cylinder assembly	10060 - 10202
		> 200 MPa to 500 MPa	> $5x10^{-4}$ x Pe to $2x10^{-4}$ x Pe	60,000	2. Calibration of weight	10060 - 10203
			< $2x10^{-4}$ x Pe	60,000	set is included.	10060 - 10204
31	Gas Pressure Measuring Instruments	0 kPa to –100 kPa	Not smaller than 0.2 mbar	8,750/range		10060 - 10313
	(gauge pressure, Pe)		Not smaller than 1 mbar	4,070/range		10060 - 10314
			Smaller than 0.2 mbar	11,250/range		10061 - 10319
		0 kPa to - 15 kPa	> $1x10^{-3}$ x Pe	8,750/range		10060 - 10315
			≤ $1x10^{-3}$ x Pe	11,250/range		10060 - 10316
		- 1 kPa to 0 kPa	> 6 x 10^{-3} x Pe	3,750/range		10060 - 10301
			$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	5,000/range		10060 - 10302
			< $1x10^{-3}$ x Pe, but not smaller than 0,003 mbar	6,250/range		10060 - 10303
		0 kPa to 3 kPa	> $6x10^{-3}$ x Pe	3,750/range		10060 - 10304
			$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	5,000/range		10060 - 10305
			< $1x10^{-3}$ x Pe, but not smaller than 0.003 mbar	6,300/range		10060 - 10306
		- 4 kPa to 4 kPa	> $6x10^{-3}$ x Pe	3,750/range		10060 - 10323
			$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	5,000/range		10060 - 10324
			< $1x10^{-3}$ x Pe, but not smaller than 0.003 mbar	6,300/range		10060 - 10325
		0 kPa to 15 kPa	> $1x10^{-3}$ x Pe	8,750/range		10060 - 10317
			≤ $1x10^{-3}$ x Pe	11,250/range		10060 - 10318
		10 kPa to 7 MPa	> $6x10^{-3}$ x Pe	4,070/range		10060 - 10307
		1,5 kPa to 7 MPa	$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	6,250/range		10060 - 10308
			< $1x10^{-3}$ x Pe	7,500/range		10060 - 10309
		> 7 MPa to 100 MPa	> $6x10^{-3}$ x Pe	7,040/range		10060 - 10310
			$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	9,850/range		10060 - 10311
			< $1x10^{-3}$ x Pe	12,670/range		10060 - 10312
32	Gas Pressure Measuring Instruments	80 kPa to 115 kPa	< $1x10^{-3}$ x Pabs	8,750/range		10060 - 10401
	(absolute pressure, Pabs)		Not smaller than 0.35 mbar	4,230/range		10060 - 10402
		0 kPa to 15 kPa	> $1x10^{-3}$ x Pabs	10,000/range		10060 - 10405
			≤ $1x10^{-3}$ x Pabs	12,500/range		10060 - 10406
		2 kPa to 7 MPa	Not smaller than 0.35 mbar	4,230/range		10060 - 10403
		1,5 kPa to 40 MPa	≥ $1x10^{-4}$ x Pabs	8,750/range		10060 - 10404
33	Mercury Barometers	85 kPa to 105 kPa	Not smaller than 0.35 mbar	6,250/range	Cistern type	10060 - 10501
				7,500/range	Fortin type	10060 - 10502
34	Hydraulic Pressure Measuring	up to 200 MPa	> $6x10^{-3}$ x Pe	5,000/range		10060 - 10601
	Instruments (gauge pressure, Pe)		$6x10^{-3}$ x Pe to $1x10^{-3}$ x Pe	7,500/range		10060 - 10602
			< 1 x 10^{-3} x Pe	10,000/range		10060 - 10603
		> 200 MPa to 500 MPa	≥ 1 x 10^{-3} x Pe	8,750/range		10060 - 10604
			< 1 x 10^{-3} x Pe	11,250/range		10060 - 10605
35	Hydraulic Pressure Measuring	0,1 MPa to 200 MPa	> $6x10^{-3}$ x Pabs	6,250/range		10060 - 10801
	Instruments		$6x10^{-3}$ x Pabs to $1x10^{-3}$ x Pabs	8,750/range		10060 - 10802
	(absolute pressure, Pabs)		< 1 x 10^{-3} x Pabs	11,250/range		10060 - 10803

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		> 200 MPa to 500 MPa	$\geq$ 1 x 10^{-3} x Pabs	10,000/range		10060 - 10804
			< 1x10^{-3} x Pabs	12,500/range		10060 - 10805
36	Gas Differential Pressure at High Static Line ressure (not higher than 40 MPa), ΔP	350 kPa maximum differential pressure	3.5 x 10^{-5} x ΔP, but not less than 2.9 Pa	16,250/sensor head	Price per 1 range of differential pressure and 1 range of high static line pressure	10060 - 10701
37	Pressure Measuring Device	0 to 3500 kPa	0.01%rdg but not less than 0.1 kPa	6,500/range	Media: Water	10060-10901
38	Blood Pressure (Static Mode) (gauge pressure, Pe)	(0 kPa to 40 kPa) (0 mm Hg to 300 mm Hg)	Not smaller than 0.13 kPa (1 mm Hg)	1,875/range	To include leak check	10060 - 10902
39	Vacuum Gauges (absolute pressure : pirani gauge, thermal conductivity gauge)	10^{5} Pa to 10^{-1} Pa	0.3% rdg to 1% rdg	7,040/sensor head	Calibration 10 points minimum	10070 - 10101
40	Vacuum Gauges (absolute pressure : capacitance diaphragm gauge)	10^{5} Pa to 10^{-1} Pa	0.2% rdg to 0.45% rdg	12,670/sensor head	Calibration 3 decades for the head range (1000, 100,10, 1) torr Calibration 2 decades for the head range 0.1 torr	10070 - 10201
41	Vacuum Gauges (absolute pressure : hot cathode ion gauge, cold cathode ion gauge)	10^{-1} Pa to 10^{-5} Pa	0.5% rdg to 6% rdg	11,090/for first decade +2,250 for next decade		10070 - 10301
42	Vacuum Gauge (absolute pressure : spinning rotor gauge)	10 Pa to 10^{-3} Pa	0.6% rdg to 4.5% rdg	to be determined		10070 - 10401
43	Additional cost for electrical calibration (which the accuracy is not better than +/-0.01% rdg)			2,250/item		10070 - 10501
44	Adjustment charge of pressure and vacuum devices for permanent laboratory calibration			50% of the calibration cost of each range		10070 - 10502
45	Measurement audit report			1,000 Baht/report + 1,000 Bath/only for artifact provided + Calibration fee		10070 - 10503
46	Vacuum Gauges by Static Expansion Method (absolute pressure : capacitance diaphragm gauge,	0.13 Pa to 1.3 kPa	0.50% rdg to 0.25% rdg	26,400/sensor head		10070 - 10601
47	Liquid Flowmeter (Turbine Flowmeter)	0.19 L/min to 150* L/min	0.075%**	13,750/ 5 points	Calibration Fluid : Water	10080 - 10101
	Liquid Flowmeter (Turbine Flowmeter)	20 L/min to 1300 L/min	0.075%	13,750		10080 - 10108
	Liquid Flowmeter (with indicator)	0.19 L/min to 150* L/min	2%	7,880/ 5 points		10080 - 10102
	Coriolis Flowmeter (Volumetric method)	0.2 L/min to 150 L/min	0.075%	13,750/5 points		10080 - 10103
	Ultrasonic flow meter (Clamp-on)	20 L/min to 1300 L/min	1.0%	8,750		10080 - 10109
48	Small Water Flow Meter (Volumetric Mode)	10 mL/h to 50 mL/h 50 mL/h to 1000 mL/h	0.35% 0.24%	16,875/range	Calibration Fluid : Water Gravimetric Method	10080-10104
49	Small Water Flow Meter (Mass Mode)	10 g/h to 50 g/h 50 g/h to 1000 g/h	0.35% 0.24%	16,875/range	Calibration Fluid : Water Gravimetric Method	10080 - 10301

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50	Medium Liquid Flow Meter (Gravimetric Method)	0.036 kg/min to 0.32 kg/min	0.30%	12,500/5 points	Calibration Fluid : Water Gravimetric Method	10080 - 10302
51	Gas Flowmeter with display in standard flow (molbloc-L)	100 cm^3/min to 24000 cm^3/min	0.25%	30,000/range	Calibration Gas: Dry Air Reference Conditions @ 0°C, 101.325 kPa	10080 - 10202
52	Gas Flowmeter with display in standard flow (molbloc-S)	1 m^3/h to 65 m^3/h	0.23%	30,000/range	Calibration Gas: Dry Air Reference Conditions @ 0°C, 101.325 kPa	10080 - 10204
53	Sonic Nozzle at ambient pressure	1 m^3/h to 100 m^3/h	0.22%	25,000/range	Calibration Gas: Ambient Air	10080 - 10205
54	Gas Flow rate (Gas meter with impluse output)	1 m^3/h to 100 m^3/h	0.20%	30,000/piece (5 points)	Comparison Method	10080 - 10203
55	Orifice flow device (Volumetric method)	(1 to 100) m^3/h	1.00%	7,500/piece (5-7 points)	Comparison Method	10080 - 10208
56	Gas Flow rate (Gas meter with flow rate output)	1.2 kg/h to 117 kg/h	0.20%	30,000/piece (5 points)	Comparison Method	10080 - 10403
57	Liquid Volume (Proving tank: Neck scale type, Weir neck type)	1 L to 10 L	0.02% to 0.03%	6,250/piece	Gravimetric Method	10080 - 10501
		<10 L to 20 L	0.02% to 0.03%	10,000/piece	Gravimetric Method	10080 - 10502
		> 2 L to 50 L	0.09%	8,750 / piece	Gravimetric Method	10080 - 10503
		> 50 L to 200 L	0.09%	13,750/piece	Gravimetric Method	10080 - 10504
58	Gas Flowmeter (Volume gas flow rate)	2 (cm^3/min) to 24000 (cm^3/min)	0.23%	17,250/range	Calibration Fluid : Nitrogen Reference Conditions @ 0 degree C, 101.325 kPa	10081 - 10101
		2 (cm^3/min) to 1 (m^3/min)	0.23%	17,250/range	Calibration Fluid : Dry Air Reference Conditions @ 0 degree C, 101.325 kPa	10081 - 10102
59	Gas Flowmeter (Mass gas flow rate)	0.043 (mg/s) to 500 (mg/s)	0.23%	17,250/range	Calibration Fluid : Nitrogen	10080 - 10201
60		0.043 (mg/s) to 21545 (mg/s)	0.23%	17,250/range	Calibration Fluid : Dry Air	10080 - 10202
61	Flow speed device	(0.1-40) m/s	0.50%	12,500/5 points+2,500/next point	Wind tunnel Calibration Fluid : Air	10080 - 10701
62	Laser Doppler Anemometer	2 m/s to 20 m/s	0.40%	30,000/piece	Wind tunnel Calibration Fluid : Air	10080-10702
63	Wind direction	0° to 360°	0.9°	12,500/5 points +2,500/next point	Wind tunnel Calibration Fluid : Air	10080-10703
64	Inter-laboratory comparison on liquid volume flow rate measurement; Artifact : Coriolis flow meter	25 L/min to 120 L/min	NIMT.MW-L1/2017	20,333/range (N = 3)	Calibration Fluid : Water	10080 - 10105
65		25 L/min to 120 L/min	NIMT.MW-L1/2019	15,750/range (N = 2)	Calibration Fluid : Water	10080 - 10106

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66	Inter-laboratory comparison on water flow meter and pressure of infusion pump analyzer	(20 - 200) mL/h ((0 - 1200) mmHg	0.35% 0.35 mbar	12,552.50/range	Infusion device analyzer	10080 - 10107
	Reference Materials For Sale					
67	Standard Torque Transducer	≤ 2,000 N·m	DIN 51309 Class 0.2, 0.1, 0.05	186,800/piece		10040 - 20501
		≤ 1,000 N·m		156,940/piece		10040 - 20502
		≤ 500 N·m		149,130/piece		
		≤ 200 N·m		139,430/piece		
		≤ 50 N·m		130,400/piece		
		≤ 20 N·m		126,930/piece		10040 - 20503
68	Standard Torque Transfer Wrench	≤ 2,000 N·m	DAkkS-DKD-R 3-7 Class 0.2	199,560/piece		10040 - 20601
		≤ 1,000 N·m		165,430/piece		10040 - 20602
		≤ 500 N·m		156,500/piece		
		≤ 200 N·m		145,420/piece		
		≤ 50 N·m		135,090/piece		
		≤ 20 N·m		131,140/piece		10040 - 20603
69	Standard Torque Transfer Wrench Model: TW-MCS01	≤ 2,000 N·m	DAkkS-DKD-R 3-7 Class 0.2	225,080/piece	Standard Option 1. Temperature compensation on zero signal 2. Temperature compensation on span signal 3. Zero balance 4. Measurement and check signals	10040-20604
		≤ 1,000 N·m		182,410/piece		
		≤ 500 N·m		171,250/piece		
		≤ 200 N·m		157,400/piece		
		≤ 50 N·m		144,490/piece		
		≤ 20 N·m		139,540/piece		
70	V-notch Charpy Impact CRM	30 J ± 10 J	According to ISO148-3	18,530/set		10050 - 20301
		100 J ± 10 J		18,530/set		10050 - 20302
	Callibration of metellic -charpy pendulum Testing Machine	Low(<40J) and high (≥40J)energy	According to ISO148-2	81,250		10050 - 20303
71	Certified Reference Block Rockwell Scale : HRA, HRB, HRC	20 HRA to 95 HRA 10 HRBW to 100 HRBW 20 HRC to 65 HRC	0.40 HRA 0.40 HRBW 0.40 HRC	10,940/piece		10050 - 20101

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	Rockwell Scale : HR30TW	29 HR30TW to 82 HR30TW	0.35 HR30TW	14,000/piece		
	Vickers : HV	HV 5, HV 10, HV 20, HV 30, HV 50, HV 100	$\left(2.1+\frac{2600}{d^2}\right)$ % of HV	20,320/piece		10050 - 20201
	Vickers : HV	HV 0.1	$\sqrt{6.5+\frac{16500}{d^2}}$ % of HV	26,250/piece		10050 - 20501
	Vickers : HV According to ASTM E92	HV 20	$\sqrt{7.9+\frac{70000}{d^2}}$ % of HV for d > 180 µm $\sqrt{6.5+\frac{16500}{d^2}}$ % of HV for d ≤ 180µm	21,000/piece		10050-20206
	Brinell Scale: HB	HBW 5/750	1.2% of HBW for Force 7.355 kN (750 kgf)	15,000/piece		10050 - 20401
		HBW 10/500	1.2% of HBW for Force 4.903 kN (500 kgf)	16,880/piece		
		HBW 10/3000	0.6% of HBW for Force 29.42 kN (3,000 kgf)			

On-site Calibration

72	Non Automatic Weighing Instruments (NAWI), Electonic balance	**Up to 65 kg**		5,200	Based on the EURAMET calibration guide No.18 version 4.0 (11/2015)	10015-30101
		Up to 5 g	0.03 mg + (7.22 X 10^{-10}) X W			
		> 5g to 100 g	0.04 mg + (4.62 X 10^{-7}) X W			
		> 100 g to 500 g	0.04 mg + (4.87 X 10^{-7}) X W			
		> 500 g to 10 kg	0.45 mg + (2.49 X 10^{-7}) X W			
		> 10 kg to 20 kg	0.64 mg + (1.59 X 10^{-7}) X W			
		> 20 kg to 65 kg	0.86 mg + (1.32 X 10^{-7}) X W			
			Note : W is any test load (g)			
73	Automatic Catchweighing Instruments (ACI)	(0.2 to 100.0) g	0.78 g	5,200/3 test loads + 1,250 next test load	1. Test loads shall be provided by client 2. In-house method based on the EURAMET - Publishable Summary for 14RPT02 AWICal	10015-30102
		> 100.0 g to 1000.0 g	1.05 g			
		> 1000.0 g to 1500.0 g	1.12 g			

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			Note : CMC is for the belt speed between 15-60 m/min			
74	Universal Testing Machine	5 N to 500 kN (Tension with increasing force only) 5 N to 500 kN (Tension with increasing and decreasing force) 5 N to 2 MN (Compression with increasing force only) 5 N to 2 MN (Compression with increasing and decreasing force)	ISO 7500-1 : 2018, 0.17 % ISO 7500-1 : 2018, 0.24% ISO 7500-1 : 2018, 0.047 % ISO 7500-1 : 2018, 0.35 %	10,000/force scale /mode	Calibrated by force-measuring device and ascessories shall be provided by customer	10030 - 30201
75	Static Torque Calibration devices - Torque Wrench Calibration Devices	1 N·m to 2,000 N·m	DAkkS-DKD-R 3-8 0.2%	5,250/range		10040 - 30303
			กมว. 1 - 2560 0.2%	4,200/range		10040 - 30304
	- Torque Screwdriver Calibration Devices	0.1 N·m to 1 N·m 1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 0.3% Based on DAkkS-DKD-R 3-8, 0.2%	5,250/range 5,250/range		10040 - 30305 10040 - 30302
	- Torque Testing Machine	1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 1.1%	5,250/range		10040 - 30306
		10 N·m to 100 N·m	Based on DAkkS-DKD-R 3-8, 0.75%	5,250/range		10040 - 30307
		0 degree to 360 degree	0.55 degree	5,250/range		10040 - 30308
76	Adjustment charge of torque device for on-site calibration			100% of the calibration cost of each item and each range		10040 - 30601
77	Inter-laboratory comparison on torque measurement					
	- Artifact: Torque wrench	40 N·m to 400 N·m	MT 01/2550	9,750		10040 - 30501
	- Artifact: Torque wrench	8 N·m to 40 N·m	MT 01.1/2551	9,750		10040 - 30502
	- Artifact: Torque wrench calibrator	10 N·m to 200 N·m	MT 02/2551	9,750		10040 - 30503
	- Artifact: Setting torque wrench	20 N·m to 330 N·m	MT 03/2553	7,800		10040 - 30504
	- Artifact: Torque wrench	400 N·m to 1000 N·m	MT 01.2/2563	7,800		10040 - 30505
	- Artifact: Torque wrench calibrator	200 N·m to 1000 N·m	MT 02.1/2564	9,750		10040 - 30506
	- Artifact: Indicating torque screwdriver	0.1 N·m to 1 N·m	MT 04/2565	7,800		10040 - 30507
	- Artifact: Indicating torque screwdriver	1 N·m to 10 N·m	MT 04.1/2565	7,800		10040 - 30508

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78	Extensometer	Gauge length up to 200 mm	According to ISO 9513	3,910	/scale	10050 - 30001
79	Callibration of Testing Machine Rockwell Hardness Testing Machine	20 HRA to 95 HRA	According to ISO 6508-2			10050 - 30102
	- direct and indirect verification	10 HRBW to 100 HRBW		8,440	/machine/scale	
	- indirect verification	20 HRC to 70 HRC		3,500	/scale	
	- diamond indenter verification	70 HR15N to 94 HR15N		4,880		
	- ball indenter verification	42 HR30N to 86 HR30N 67 HR15TW to 93 HR15TW 29 HR30TW to 82 HR30TW 70 HREW to 100 HREW		1,000		
80	Calibration of Testing Machine Vickers Hardness Testing Machine	HV 0.2, HV 0.3, HV 0.5, HV 1, HV 5, HV 10, HV 20, HV 30, HV 50	According to ISO 6507-2			10050 - 30202
	- direct and indirect verification			8,440	/machine/scale	
	- indirect verification			3,500	/scale	
	- Vickers Indenter	Tip angle 0°,90°, 136° Line of conjunction 0 to 5 µm	± 0.15° ± 0.2 µm	10,000		
81	Callibration of Testing Machine Brinell Hardness testing machine	HBW 10/3000, HBW 10/500, HBW 10/100	According to ISO 6506-2			10050 - 30402
	- direct and indirect verification	HBW 5/750, HBW 5/125, HBW 5/62.5		8,440	/machine/scale	
	- indirect verification	HBW 2.5/62.5, HBW 2.5/31.25, HBW 2.5/15.625		3,500	/scale	
	- ball indenter verification	HBW 1/30		1,000		
82	Inter-laboratory comparison on hardness measurement					
	- Artifact hardness specimen	Scale B	MH01.1	9,750		10050 - 30103
	- Artifact hardness specimen	Scale C	MH01.2	9,750		10050 - 30203
	- Artifact hardness specimen	Scale R	MH01.3	9,820	Plastic artifacts shall be provided by client	10050 - 30803
	- Artifact hardness specimen	Scale A	MH01.4	27,250		10050 - 31803
	- Artifact hardness specimen	Scale 30N	MH01.5	27,250		10050 - 31903
	- Artifact hardness specimen	Scale 30TW	MH01.6	27,250		10050 - 32003
	- Artifact hardness specimen	HV 5	MH02.1	8,250		10050 - 30403
	- Artifact hardness specimen	HV 10	MH02.2	8,250		10050 - 31403
	- Artifact hardness specimen	HV 30	MH02.3	8,250		10050 - 31503

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	- Artifact hardness testing machine	Rockwell Scale A, B and C	MH03	9,750		10050 - 30303
	- Artifact hardness testing machine	Rockwell Scale A	MH03.1	5,500		10050 - 32303
	- Artifact hardness testing machine	Rockwell Scale B	MH03.2	5,500		10050 - 32403
	- Artifact hardness testing machine	Rockwell Scale C	MH03.3	5,500		10050 - 32503
	- Artifact hardness testing machine	Rockwell Scale 15N	MH03.4	8,782		10050 - 32103
	- Artifact hardness testing machine	Rockwell Scale 30N	MH03.5	8,782		10050 - 32203
	- Artifact hardness testing machine	Rockwell Scale 15TW	MH03.6	8,782		10050 - 32603
	- Artifact hardness testing machine	Rockwell Scale 30TW	MH03.7	8,782		10050 - 32703
	- Artifact hardness testing machine	Vickers HV 0.3	MH04.1	5,500		10050 - 31203
	- Artifact hardness testing machine	Vickers HV 1	MH04.2	5,500		10050 - 31603
	- Artifact hardness testing machine	Vickers HV 5	MH04.3	5,500		10050 - 31703
	- Artifact hardness testing machine	Vickers HV 10	MH04.4	5,500		10050 - 31103
	- Artifact hardness testing machine	Vickers HV 0.1	MH04.5	13,375		10050 - 32803
	- Artifact hardness testing machine	Vickers HV 0.2	MH04.6	13,375		10050 - 32903
	- Artifact hardness testing machine	Vickers HV 0.5	MH04.7	13,375		10050 - 33003
	- Artifact hardness testing machine	Brinell HBW 10/3000	MH05.1	5,500		10050 - 30903
83	Absolute Gravity	9.75 m/s^2 to 9.85 m/s^2	Not smaller than 10 µGal (0.01 ppm)	240,000 120,000	for the first measurement location for each additional location	10060 - 30101
84	Local Gravity	9.75 m/s^2 to 9.85 m/s^2	Not smaller than 180 µGal (0.18 ppm)	40,000	Using relative method	10060 - 30102
85	Mooney Viscometer	All range	According to ISO 289	20,000	/machine	10050 - 30602
86	Melt flow index tester (Extrusion plastometer)	All range	According to ASTM D1238	15,000	/machine	10050-30702
87	Gas Pressure Measuring Instruments (on-site) - (differential gauge pressure,Pe) - (absolute pressure, Pabs)	 0.1 kPa to 130 kPa 10 kPa to 700 kPa	 2.6E-4P_e but not less than 0.03 kPa 2.0E-4P_{abs} but not less than 0.03 kPa	 6,250 baht/range	 Differential against ambient pressure	10060 - 30103
88	Displacement Measuring Systems andDevices Used in Material Testing Machines	Displacement length up to 2,000 mm.	According to ASTM E2309/E2309M-16	5,000	/machine	10050-30802
89	Speed for material testing machines	Speed 0.05 mm/Min to 2,500 mm/Min.	According to ASTM E2658-15	5,000	/speed	10050 - 30902
90	Rolling resistance testing machine (Force method)					

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	- Run-out (Radial run-out and Lateral run-out)	Nominal section width, RN from 95 mm to 315 mm	Radial run-out = 0.02 mm	5,000.00	UN Regulation No. 117 and มอก. 2721-2560	10040 - 30701
			Lateral run-out = 0.02 mm	5,000.00		10040 - 30702
	- Load application (Deviation angular from wheel center)	At Load index, LI = 0 to 121 (TLCC = 46 kgf to 1,450 kgf) and At Load index, LI = 122 to 279 (TLCC = 1,500 kgf to 136,000 kgf)	0.002°	7,500.00		10040 - 30703
	- Tyre alignment (Camber angle and Slip angle)		Camber angle = 0.035°	7,500.00		10040 - 30704
			Slip angle = 0.030°	7,500.00		10040 - 30705
	- Tyre load		0.037% for increasing only 0.11% for increasing and decreasing	10,000.00		10040 - 30706
	- Spindle force		0.037% for increasing only 0.11% for increasing and decreasing	10,000.00 / Direction		10040 - 30707
	- Surface speed	0 km/h to 300 km/h	0.20 km/h	5,000.00 / Direction		10040 - 30708
	- Drum diameter	1,700 mm and 2,000 mm	0.15 mm	7,500.00		10040 - 30709
91	Rolling resistance testing machine (Torque method)					
	- Run-out (Radial run-out and Lateral run-out)	Nominal section width, RN from 95 mm to 315 mm	Radial run-out = 0.02 mm	5,000.00	UN Regulation No. 117 and มอก. 2721-2560	10040 - 30801
			Lateral run-out = 0.02 mm	5,000.00		10040 - 30802
	- Load application (Deviation angular from wheel center)	At Load index, LI = 0 to 121 (TLCC = 46 kgf to 1,450 kgf) and At Load index, LI = 122 to 279 (TLCC = 1,500 kgf to 136,000 kgf)	0.001°	7,500.00		10040 - 30803
	- Tyre alignment (Camber angle and Slip angle)		Camber angle = 0.035°	7,500.00		10040 - 30804
			Slip angle = 0.030°	7,500.00		10040 - 30805
	- Tyre load		0.037% for increasing only 0.11% for increasing and decreasing	10,000.00		10040 - 30806
	- Torque input	0.1 N·m to 5 kN·m	0.015% (0.1 N·m to 1 N·m) 0.010% (1 N·m to 5 kN·m)	20,000.00 / Range		10040 - 30807
	- Surface speed	0 km/h to 300 km/h	0.20 km/h	5,000.00 / Direction		10040 - 30808
	- Drum diameter	1,700 mm and 2,000 mm	0.15 mm	7,500.00		10040 - 30809
92	Calibration of Rockwell standard machine.	Scale A, B, C, E, 30N, 30T, 15N, 15T	According to ISO6508-3	32,000 4,500	/machine/scale /additional scale	10050-30105
93	Calibration of Vickers standard machine.	scale HV 0.2, HV 0.3, HV 0.5 and HV 1	According to ISO6507-3 0.08 % for test force 0.1 s for testing cycle 0.4 µm for measuring system	32,000	/machine/scale	10050-30505
				5,700	/additional scale	
		scale HV 5, HV 10, HV 20, HV 30 and HV 50	According to ISO6507-3 0.08 % for test force 0.1 s for testing cycle 0.4 µm for measuring system	32,000	/machine/scale	10050-30205
				5,000	/additional scale	

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94	Calibration of Brinell standard machine.	HBW 10/3000, HBW 10/1500, HBW 10/1000, HBW 10/500, HBW 10/250, HBW 10/100, HBW 5/750, HBW 5/250, HBW 5/125, HBW 5/62.5, HBW 5/25, HBW 2.5/187.5, HBW 2.5/62.5, HBW 2.5/31.25, HBW 2.5/15.625, HBW 2.5/6.25, HBW 1/30, HBW 1/10, HBW1/5, HBW 1/2.5, HBW 1/1	According to ISO6506-3	33,000	/machine/scale	10050-30305
				4,600	/additional scale	
95	Dynamic growth of tyre testing machine					
	- Run-out (Radial run-out and Lateral run-out)	Nominal rim diameter, d from 102 mm to 584 mm	Radial run-out = 0.02 mm	5,000.00	UN Regulation No. 117 and มอก. 2721-2560	10040 - 30901
			Lateral run-out = 0.02 mm	5,000.00		10040 - 30902
	- Tyre speed	0 km/h to 300 km/h	0.20 km/h	5,000.00 / Direction		10040 - 30903
	- Centrifugal radius	127 mm to 434 mm (254 mm to 868 mm diameter)	0.11 mm	7,500.00		10040 - 30904
96	Volume of Liquid	(1 to 20) L	0.15%	6,250	/ piece / range	10080-10505
		(>20 to 50) L	0.15%	10,000	/ piece / range	10080-10506
		(>50 to 100) L	0.15%	5,000	/ piece / range	10080-10507
		(>100 to 500) L	0.15%	6,875	/ piece / range	10080-10508
		(>500 to 1000) L	0.15%	10,000	/ piece / range	10080-10509
		(>1000 to 2000) L	0.15%	13,750	/ piece / range	10080-10510
		(>2000 to 3000) L	0.15%	16,250	/ piece / range	10080-10511
		(>3000 to 4000) L	0.15%	21,250	/ piece / range	10080-10512