National Institute of Metrology (Thailand)
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Item No.	Description	Range	Accuracy / Uncertainty	Price (THB)	Remark	Code
Calibration Fee						
Mechanical Metrology						
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

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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}	3.22×10^{-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 - Alcoholometer		0.25 kg m^{-3} 0.00010 sp/gr 0.030 °API 0.30 °Brix 0.030 Bé 0.10 %vol	4,230/3 points + 1250 next point		10021 - 10302

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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} 1000 to 1600 kg m^{-3}	0.020 kg m^{-3} 0.030 kg m^{-3}	22,000/piece	By direct comparison with reference fluids in accordance with ISO 15212	10021 - 10501
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	Dynamic viscosity of liquid	100 to 15000 mPa·s	10%	750/sample	By rotational viscometer method	10022 - 10101
20	Force-proving instrument	1 kN to 110* kN	ISO 376:2011, 0.0020 %	16,250/direction	Calibrated by deadweight force	10030 - 10101
		0.1 kN to 1.5 kN	ISO 376:2011, 0.0050 %	13,500/direction	standard machine.	10030 - 10102
		0.2 kN to 5 kN	ISO 376:2011, 0.0050 %	13,500/direction	Digital indicator shall be provided by	10030 - 10103
		16 kN to 500 kN	ISO 376:2011, 0.0080 %	23,000/direction	customer.	10030 - 10104
		50 N to 500 N	ISO 376:2011, 0.0040 %	8,500/direction		10030 - 10105
		10 N to 200 N	ISO 376:2011, 0.0040%	8,500/direction		10030 - 10106
		1 N to 50 N	ISO 376:2011, 0.010%	8,500/direction		10030 - 10107
		20 kN to 100 kN	Accroding to ISO 376:2011 Class 0.5 to 2	11,000/direction	Calibrated by force-comparator machine.	10030 - 10201
		> 100 kN to 500 kN		15,000/direction	Digital indicator shall be provided by customer.	10030 - 10202
21	Strain Amplifier	± 2.0 mV/V	2.5 x 10-5 mV/V	4,200/range	Calibrated by Bridge Calibration Unit	10030 - 10401
	(Digital Measurement Amplifier)	± 5.0 mV/V	3.0 x 10-4 mV/V	4,200/range		
22	Bridge Calibration Unit	± 2.5 mV/V with carrier frequency 225 Hz	0.000070 nV/V	5,000/range	Calibrated by high precision digital measuring unit	10030-10402
		± 5.0 mV/V with carrier frequency 225 Hz	0.000070 nV/V	5,000/range		
23	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%	13,100/range		10040 - 10101
		100 N·m to 5,000 N·m	DIN 51309, 0.01%	26,250/range		10040 - 10102
24	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%	13,100/range		10040 - 10202
25	Static Torque Calibration Devices - Torque Wrench Calibration Devices	1 N·m to 2,000 N·m	DAkkS-DKD-R 3-8, 0.2%	6,550/range		10040 - 10303

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		1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty <0.5%	DKD-R 10-8, 0.2%	18,750/range		10040-10310
		1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-10311
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty <0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-10312
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	6,550/range		10040-10313
		1 N·m to 1,000 N·m, Sensor fixed and Connection profile rotatable, target uncertainty <0.5%	DKD-R 10-8, 0.2%	18,750/range		10040-10314
		1 N·m to 1,000 N·m, Sensor fixed and Connection profile rotatable, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-10315
		1 N·m to 1,000 N·m, Sensor and Connection profile fixed, target uncertainty <0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-10316
		1 N·m to 1,000 N·m, Sensor and Connection profile fixed, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	6,550/range		10040-10317
			มกม. 1 - 2560 0.2%	5,250/range		10040 - 10304
	- Torque Screwdriver Calibration Devices	0.1 N·m to 1 N·m	Based on DAkkS-DKD-R 3-8, 0.3%	6,550/range		10040 - 10305
		1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 0.2%	6,550/range		10040 - 10302
	- Rotary torque transducer	1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty < 0.5 %,	DKD-R 10-8, 0.40 %	18,750/range		10040-10318
		1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty ≥ 0.5 %, For torque with cross force application		12,650/range		10040-10319
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty < 0.5 %, For torque with cross force application		12,650/range		10040-10320
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty ≥ 0.5 %, For torque with cross force application		6,550/range		10040-10321
		1 N·m to 10 N·m, For pure torque application	Base on DIN 51309, 1.0 %	6,550/range		10040-10322
		(0-360) degree, For angle	0.40 degree	6,550/range		10040-10323
26	Hand Torque Tools (Type I and Type II) - Wrench	1 N·m to 1,000 N·m	ISO 6789, 1%	4,350/range		10040 - 10401
	- Screwdriver	0.1 N·m to 1 N·m	ISO 6789, 1.5%	4,350/range		10040 - 10402

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		1 N·m to 10 N·m	ISO 6789, 1%	4,350/range		
27	Torque multiplier	340 N·m to 2,700 N·m	Based on ISO 6789 : 2003(E), 1.5%	9,350/range		10040 - 10501
28	Adjustment charge of torque device for permanent laboratory calibration			100% of the calibration cost of each item and each range		10040 - 10601
29	Recalibration of Reference Block Rockwell Scale : HRA, HRB, HRC	20 HRA to 95 HRA 10 HRBW to 100 HRBW 20 HRC to 70 HRC	0.40 HRA 0.40 HRBW 0.40 HRC	6,550/piece	Reference Block shall be provided by client.	10050 - 10101
	Rockwell Scale : HR30TW	29 HR30TW to 82 HR30TW	0.40 HR30TW	9,350/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	7,250/piece		10050 - 10201
	Vickers : HV according to ISO 6508-3	HV 0.1	$\sqrt{6.5+\frac{16500}{d^2}}$ % of HV	7,250/piece		10050 - 10501
	Vickers : HV **According to ASTM E92	HV10, 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	17,500/piece		10050-10206
	Brinell Scale: HB	HBW 5/750	1.2% of HBW for Force 7.355 kN (750 kgf)	6,250/piece		10050 - 10401
		HBW 10/500	1.2% of HBW for Force 4.903 kN (500 kgf)	7,800/piece		
		HBW 10/3000	0.6% of HBW for Force 29.42 kN (3,000 kgf)			
30	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	8,550/machine		10050 - 10302
		Durometer Type C	ASTM D2240			
31	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	10060 - 10101
			< $1x10^{-4}$ x Pe	50,000		10060 - 10102
		>7 MPa to 40 MPa	> $5x10^{-4}$ x Pe	55,000		10060 - 10103

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			$5x10^{-4}$ x Pe to $1x10^{-4}$ x Pe	55,000	set is included.	10060 - 10104
			< $1x10^{-4}$ x Pe	55,000		10060 - 10105
32	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
33	Water Pressure Balances	Up to 400 MPa	> 5x10-4 x Pe to 1x10-4 x Pe	50,000	1. Price per 1 piston & cylinder assembly	10060 - 10205
34	Gas Pressure Measuring Instruments (gauge pressure, Pe)	0 kPa to –100 kPa	Not smaller than 0.2 mbar	8,750/range		10060 - 10313
			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
		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
35	Gas Pressure Measuring Instruments (absolute pressure, Pabs)	80 kPa to 115 kPa	< $1x10^{-3}$ x Pabs	8,750/range		10060 - 10401
			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 7 MPa	≥ $1x10^{-4}$ x Pabs	8,750/range		10060 - 10407
		>7 MPa to 40 MPa	≥ $1x10^{-4}$ x Pabs	14,000/range		10060 - 10408
36	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
37	Hydraulic Pressure Measuring Instruments (gauge pressure, Pe)	up to 200 MPa	> $6x10^{-3}$ x Pe	5,000/range		10060 - 10601
			$6x10^{-3}$ 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

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38	Hydraulic Pressure Measuring Instruments (absolute pressure, Pabs)	0,1 MPa to 200 MPa	> $6x10^{-3}$ x Pabs	6,250/range		10060 - 10801
			$6x10^{-3}$ x Pabs to $1x10^{-3}$ x Pabs	8,750/range		10060 - 10802
			< $1 x 10^{-3}$ x Pabs	11,250/range		10060 - 10803
		> 200 MPa to 500 MPa	≥ $1 x 10^{-3}$ x Pabs	10,000/range		10060 - 10804
			< $1x10^{-3}$ x Pabs	12,500/range		10060 - 10805
39	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
40	Pressure Measuring Device	0 to 3500 kPa	0.01%rdg but not less than 0.1 kPa	6,500/range	Media: Water	10060-10901
41	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
42	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
43	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
44	Adjustment charge of pressure and vacuum devices for permanent laboratory calibration			100% 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
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

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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 @	10081 - 10101
59		2 (cm^3/min) to 1 (m^3/min)	0.23%	17,250/range	0 degree C, 101.325 kPa Calibration Fluid : Dry Air Reference Conditions @ 0 degree C, 101.325 kPa	10081 - 10102
60	Gas Flowmeter	0.043 (mg/s) to 500 (mg/s)	0.23%	17,250/range	Calibration Fluid : Nitrogen	10080 - 10201
61	(Mass gas flow rate)	0.043 (mg/s) to 21545 (mg/s)	0.23%	17,250/range	Calibration Fluid : Dry Air	10080 - 10202
62	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
63	Laser Doppler Anemometer	2 m/s to 20 m/s	0.40%	30,000/piece	Wind tunnel Calibration Fluid : Air	10080-10702
64	Wind direction	0° to 360°	0.9°	12,500/5 points +2,500/next point	Wind tunnel Calibration Fluid : Air	10080-10703
65	Air speed anemometers (Cup and Vane anemometer)	(1-30) m/s	1% of reading	12,500/15 points +2,500/next point	Wind tunnel Calibration Fluid : Air	10080-10704
66	Air speed anemometers	(0.1-40) m/s	0.80%	10,000/5 points	Wind tunnel Calibration Fluid : Air	10080-10705
67	Type S Pitot Static tube	(5-30) m/s	1.00%	10,000/5 points	Wind tunnel Calibration Fluid : Air	10080-10706

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68	Ultrasonic Thickness Measurement (Thickness calibration block)	(2.54 - 12.70) mm and 100 mm	0.3% of reading	2,500/5 points +500/next point	Direct measurement by ultrasonic thickness system	10080-10601
69	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
70		25 L/min to 120 L/min	NIMT.MW-L1/2019	15,750/range (N = 2)	Calibration Fluid : Water	10080 - 10106
71	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

74	Standard Torque Transducer	≤ 2,000 N·m	DIN 51309 Class 0.2, 0.1, 0.05	233,500/piece		10040 - 20501
		≤ 1,000 N·m		196,150/piece		10040 - 20502
		≤ 500 N·m		186,400/piece		
		≤ 200 N·m		174,250/piece		
		≤ 50 N·m		163,000/piece		
		≤ 20 N·m		158,650/piece		10040 - 20503
75	Standard Torque Transfer Wrench	≤ 2,000 N·m	DAkkS-DKD-R 3-7 Class 0.2	249,450/piece		10040 - 20601
		≤ 1,000 N·m		206,750/piece		10040 - 20602
		≤ 500 N·m		195,600/piece		
		≤ 200 N·m		181,750/piece		
		≤ 50 N·m		168,850/piece		
		≤ 20 N·m		163,900/piece		10040 - 20603
76	Standard Torque Transfer Wrench Model: TW-MCS01	≤ 2,000 N·m	DAkkS-DKD-R 3-7 Class 0.2	281,350/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		228,000/piece		
		≤ 500 N·m		214,050/piece		
		≤ 200 N·m		196,750/piece		
		≤ 50 N·m		180,600/piece		
		≤ 20 N·m		174,400/piece		

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77	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
78	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	13,670/piece		10050 - 20101
	Rockwell Scale : HR30TW	29 HR30TW to 82 HR30TW	0.40 HR30TW	17,500/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	25,400/piece		10050 - 20201
	Vickers : HV	HV 0.1	$\sqrt{6.5+\frac{16500}{d^2}}$ % of HV	32,800/piece		10050 - 20501
	Vickers : HV According to ASTM E92	HV10, 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	26,250/piece		10050-20206
	Brinell Scale: HB	HBW 5/750	1.2% of HBW for Force 7.355 kN (750 kgf)	18,750/piece		10050 - 20401
		HBW 10/500	1.2% of HBW for Force 4.903 kN (500 kgf)	21,100/piece		
		HBW 10/3000	0.6% of HBW for Force 29.42 kN (3,000 kgf)			

On-site Calibration

79	Non Automatic Weighing Instruments (NAWI), Electonic balance	**Up to 65 kg**				
		Up to 5 g	0.03 mg + (7.22 X 10^{-10}) X W			

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		> 5g to 100 g	0.04 mg + (4.62 X 10^{-7}) X W	5,200	Based on the EURAMET calibration guide No.18 version 4.0 (11/2015)	10015-30101
		> 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)				
80	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			
		Note : CMC is for the belt speed between 15-60 m/min				
81	Universal Testing Machine	5 N to 500 kN (Tension with increasing force only)	ISO 7500-1 : 2018, 0.17 %	11,000/force scale	Calibrated by force-measuring	10030 - 30201
		5 N to 500 kN (Tension with increasing and decreasing force)	ISO 7500-1 : 2018, 0.24%	/mode	device and accessories shall be	
		5 N to 2 MN (Compression with increasing force only)	ISO 7500-1 : 2018, 0.047 %		provided by customer	
		5 N to 2 MN (Compression with increasing and decreasing force)	ISO 7500-1 : 2018, 0.35 %			
82	Static Torque Calibration devices - Torque Wrench Calibration Devices	1 N·m to 2,000 N·m	DAkkS-DKD-R 3-8, 0.2%	6,550/range		10040 - 30303
		1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty <0.5%	DKD-R 10-8, 0.2%	18,750/range		10040-30310
		1 N·m to 1,000 N·m, Sensor and Connection profile rotatable, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-30311
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty <0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-30312
		1 N·m to 1,000 N·m, Sensor rotatable and Connection profile fixed, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	6,550/range		10040-30313
		1 N·m to 1,000 N·m, Sensor fixed and Connection profile rotatable, target uncertainty <0.5%	DKD-R 10-8, 0.2%	18,750/range		10040-30314

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		1 N·m to 1,000 N·m, Sensor fixed and Connection profile rotatable, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-30315
		1 N·m to 1,000 N·m, Sensor and Connection profile fixed, target uncertainty <0.5%	DKD-R 10-8, 0.2%	12,650/range		10040-30316
		1 N·m to 1,000 N·m, Sensor and Connection profile fixed, target uncertainty ≥0.5%	DKD-R 10-8, 0.2%	6,550/range		10040-30317
			มกอช. 1 - 2560 0.2%	5,250/range		10040 - 30304
	- Torque Screwdriver Calibration Devices	0.1 N·m to 1 N·m	Based on DAkkS-DKD-R 3-8, 0.3%	6,550/range		10040 - 30305
		1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 0.2%	6,550/range		10040 - 30302
	- Torque Testing Machine	1 N·m to 10 N·m	Based on DAkkS-DKD-R 3-8, 1.1%	6,550/range		10040 - 30306
		10 N·m to 100 N·m	Based on DAkkS-DKD-R 3-8, 0.75%	6,550/range		10040 - 30307
		500 N·m to 5000 N·m	Based on DIN 51309, 1.8 %	8,000/range		10040 - 30309
		0 degree to 360 degree	0.55 degree	6,550/range		10040 - 30308
83	Adjustment charge of torque device for on-site calibration			100% of the calibration cost of each item and each range		10040 - 30601
84	Inter-laboratory comparison on torque measurement					
	- Artifact: Torque wrench	40 N·m to 400 N·m	MT 01/2550	12,150		10040 - 30501
	- Artifact: Torque wrench	8 N·m to 40 N·m	MT 01.1/2551	12,150		10040 - 30502
	- Artifact: Torque wrench calibrator	10 N·m to 200 N·m	MT 02/2551	12,150		10040 - 30503
	- Artifact: Setting torque wrench	20 N·m to 330 N·m	MT 03/2553	9,750		10040 - 30504
	- Artifact: Torque wrench	400 N·m to 1000 N·m	MT 01.2/2563	9,750		10040 - 30505
	- Artifact: Torque wrench calibrator	200 N·m to 1000 N·m	MT 02.1/2564	12,150		10040 - 30506
	- Artifact: Indicating torque screwdriver	0.1 N·m to 1 N·m	MT 04/2565	9,750		10040 - 30507
	- Artifact: Indicating torque screwdriver	1 N·m to 10 N·m	MT 04.1/2565	9,750		10040 - 30508
	- Artifact: Indicating Torque Wrench	1 N·m to 50 N·m	MT 05/2566	12,150		10040 - 30509
	- Artifact: Indicating Torque Wrench	50 N·m to 200 N·m	MT 05.1/2566	12,150		10040 - 30510

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	- Artifact: Indicating Torque Wrench	200 N·m to 1000 N·m	MT 05.2/2566	12,150		10040 - 30511
	- Artifact: Torque Transducer	10 N·m to 200 N·m	MT 06/2566	12,150		10040 - 30512
	- Artifact: Torque Transducer	200 N·m to 1000 N·m	MT 06.1/2566	12,150		10040 - 30513
	- Artifact: Setting Torque Wrench	20 N·m to 330 N·m	MT 07/2566	9,750		10040 - 30514
85	Extensometer	Gauge length up to 200 mm	According to ISO 9513	3,910	/scale	10050 - 30001
86	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		10,550	/machine/scale	
	- indirect verification	20 HRC to 70 HRC		4,370	/scale	
	- diamond indenter verification	70 HR15N to 94 HR15N		6,100		
	- ball indenter verification	42 HR30N to 86 HR30N 67 HR15TW to 93 HR15TW 29 HR30TW to 82 HR30TW 70 HREW to 100 HREW		1,250		
87	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			10,550	/machine/scale	
	- indirect verification			4,370	/scale	
	- Vickers Indenter	Tip angle 0°,90°, 136° Line of conjunction 0 to 5 µm	± 0.15° ± 0.2 µm	12,500		
88	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		10,550	/machine/scale	
	- indirect verification	HBW 2.5/62.5, HBW 2.5/31.25, HBW 2.5/15.625		4,370	/scale	
	- ball indenter verification	HBW 1/30		1,250		
89	Inter-laboratory comparison on hardness measurement					
	- Artifact hardness specimen	Scale B	MH01.1	12,150		10050 - 30103
	- Artifact hardness specimen	Scale C	MH01.2	12,150		10050 - 30203
	- Artifact hardness specimen	Scale R	MH01.3	12,250	Plastic artifacts shall be provided by client	10050 - 30803
	- Artifact hardness specimen	Scale A	MH01.4	34,000		10050 - 31803
	- Artifact hardness specimen	Scale 30N	MH01.5	34,000		10050 - 31903
	- Artifact hardness specimen	Scale 30TW	MH01.6	34,000		10050 - 32003

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	- Artifact hardness specimen	HV 5	MH02.1	10,300		10050 - 30403
	- Artifact hardness specimen	HV 10	MH02.2	10,300		10050 - 31403
	- Artifact hardness specimen	HV 30	MH02.3	10,300		10050 - 31503
	- Artifact hardness testing machine	Rockwell Scale A, B and C	MH03	12,150		10050 - 30303
	- Artifact hardness testing machine	Rockwell Scale A	MH03.1	6,850		10050 - 32303
	- Artifact hardness testing machine	Rockwell Scale B	MH03.2	6,850		10050 - 32403
	- Artifact hardness testing machine	Rockwell Scale C	MH03.3	6,850		10050 - 32503
	- Artifact hardness testing machine	Rockwell Scale 15N	MH03.4	10,950		10050 - 32103
	- Artifact hardness testing machine	Rockwell Scale 30N	MH03.5	10,950		10050 - 32203
	- Artifact hardness testing machine	Rockwell Scale 15TW	MH03.6	10,950		10050 - 32603
	- Artifact hardness testing machine	Rockwell Scale 30TW	MH03.7	10,950		10050 - 32703
	- Artifact hardness testing machine	Vickers HV 0.3	MH04.1	6,850		10050 - 31203
	- Artifact hardness testing machine	Vickers HV 1	MH04.2	6,850		10050 - 31603
	- Artifact hardness testing machine	Vickers HV 5	MH04.3	6,850		10050 - 31703
	- Artifact hardness testing machine	Vickers HV 10	MH04.4	6,850		10050 - 31103
	- Artifact hardness testing machine	Vickers HV 0.1	MH04.5	16,700		10050 - 32803
	- Artifact hardness testing machine	Vickers HV 0.2	MH04.6	16,700		10050 - 32903
	- Artifact hardness testing machine	Vickers HV 0.5	MH04.7	16,700		10050 - 33003
	- Artifact hardness testing machine	Brinell HBW 10/3000	MH05.1	6,850		10050 - 30903
90	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
91	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
92	Mooney Viscometer	All range	According to ISO 289	25,000	/machine	10050 - 30602
93	Melt flow index tester (Extrusion plastometer)	All range	According to ASTM D1238	15,000	/machine	10050-30702
94	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
95	Displacement Measuring Systems andDevices Used in Material Testing Machines	Displacement length up to 2,000 mm.	According to	6,250	/machine	10050-30802

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			ASTM E2309/E2309M-16			
96	Speed for material testing machines	Speed 0.05 mm/Min to 2,500 mm/Min.	According to ASTM E2658-15	6,250	/speed	10050 - 30902
97	Rolling resistance testing machine (Force 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 - 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
98	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
99	Calibration of Rockwell standard machine.	Scale A, B, C, E, 30N, 30T, 15N, 15T	According to ISO6508-3	32,000 5,620	/machine/scale /additional scale	10050-30105
100	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
				7,100	/additional scale	

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		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
				6,250	/additional scale	
101	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
				5,750	/additional scale	
102	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	6,250	UN Regulation No. 117 and มอก. 2721-2560	10040 - 30901
			Lateral run-out = 0.02 mm	6,250		10040 - 30902
	- Tyre speed	0 km/h to 300 km/h	0.20 km/h	6,250 / Direction		10040 - 30903
	- Centrifugal radius	127 mm to 434 mm (254 mm to 868 mm diameter)	0.11 mm	9,350		10040 - 30904
103	Endurance testing mchaine				UN Regulation No. 30, UN Regulation No. 54, UN Regulation No. 75 and มอก. 2718-2560, มอก. 2719-2560, มอก. 2720-2560	
	- Tyre load	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)	0.047 % for increasing force only 0.35 % for increasing and decreasing force	12,500/range/direction		10040-30905
	- Surface speed	0 km/h to 300 km/h	0.20 km/h	6,250 / Direction		10040-30906
	- Drum diameter	1,700 mm and 2,000 mm	0.15 mm	9,350		10040-30907
104	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
105	Wheel deviation measurement system					
	- Run-out (vertical run-out and horizontal run-out)	0 mm to ± 2.5 mm	Vertical run-out = 0.50 mm	5,000.00	มอก. 2207-2562	10040-31001
			Horizontal run-out = 0.50 mm	5,000.00		