

	UGANDA NATIONAL BUREAU OF STANDARDS NATIONAL METROLOGY LABORATORY	Document No: QL/4.04-00-001
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In the derivation of calibration charges a number of factors have been taken into consideration. These include the following;

1. Personnel Salaries and man-hours for calibration of each Unit under calibration (UUC)
2. Utilities (water and electricity) and rent
3. Maintenance of equipment (air conditioning, power stabilizer), courier and calibration of reference standards
4. Laboratory infrastructure (equipment, standards and laboratories) Depreciation

Computations are based on the basis of 8 working hour per day and 22 working days in a month, time required to calibrate a UUC (1 – 18 hours), accuracy level factor (1 – 5), physical effort and difficulty in under taking the calibration factor (0.1 – 5).

Overhead costs and logistics (safari day and night allowances, hire of Labour, dipsticks or face plates, water-finding pastes, fuel for the vehicle and accessories[crane and pump], etc.) are based on prevailing prices and approved allowances. This is computed using the logistics computation spreadsheet.

Calibration charge = number of hour required to calibrate the UUC x Accuracy factor x physical effort and difficulty factor x hourly cost.

Hourly cost = (Contributions due to Development of laboratory infrastructure + maintenance and calibration of equipment and reference standards + Personnel Costs + Utilities + Consumables expressed on an hourly basis) rounded to the nearest ten thousands.

Cost of calibration = total calibration charges + Overhead and logistic costs

Example:

An analytical balance of capacity 210g with a resolution of 0.001g,

- Time required for the complete calibration is 1 hour,
- Accuracy factor is 4,
- Physical effort and difficulty factor is 0.6,
- Hourly cost is UGX 79,864

Calibration charge = 1x 4 x 0.6 x 79,864 = 191,673.6 ≈ UGX 190,000

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No.	Equipment	Range/Capacity		Unit	Accuracy	Rate
		From	To			
1	Weighing Machines					
(a)	Analytical/Micro Balances	0	2	kg	> 0.0001g	200,000
		3	10	kg		280,000
		11	20	kg		320,000
		20	30	kg		360,000
(b)	Precision Balances	0	5	kg	> 0.001g	190,000
		6	10	kg		220,000
		11	20	kg		260,000
		20	30	kg	Over 20 kg	290,000
(c)	Ordinary scales, Dener scales	0	10	kg	> 0.01g	170,000
		11	20	kg		190,000
		21	50	kg		220,000
		51	100	kg		240,000
		101	200	kg		260,000
		201	300	kg		290,000
		301	500	kg		310,000
		501	1000	kg		470,000
		0	100	kg	> 1g	160,000
		101	150	kg		190,000
		151	200	kg		220,000
		201	300	kg		260,000
		301	500	kg		290,000
		501	1000	kg		430,000
		0	100	kg	1g <> 1kg	160,000
		101	150	kg		190,000
		151	200	kg		220,000
		201	300	kg		260,000
		301	500	kg		290,000
		501	1000	kg		430,000
(d)	High load Weighers (e.g. Chutes, axle load Weighers, Cranes & weigh-bridges) /Tensile testers	1001	2000	kg		340,000
		2001	3000	kg		340,000
		3001	5000	kg		360,000
		5001	10000	kg		580,000

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No.	Equipment	Range/Capacity		Unit	Accuracy	Rate
		From	To			
		10001	20000	kg		620,000
		20001	30000	kg		670,000
		30001	50000	kg		720,000
		50001	100000	kg		770,000
2	Masses					
(a)	Weights ,Ordinary	0	5	kg		20,000
		6	20	kg		20,000
		21	50	kg		50,000
		60		kg		10,000 Every extra 10 kg
(b)	Dead Weights	0	100	kg		80,000
		101	200	kg		110,000
		201	500	kg		140,000
		501	1000	kg		220,000
		1001	1500	kg		290,000
(c)	Weights, Precision	0	20	kg	> 0.00001g	80,000
					> 0.0001g	60,000
					> 0.001g	50,000
					> 0.01g	30,000
					> 0.1g	20,000
3	Volume Measures					
(a)	glass-ware	0	1	litre		20,000
		1.1	5	litre		40,000
		5.1	20	litre		60,000
		20		litre		70,000
				litre	multichannel pipettes	5,000 for every extra channel
(b)	Metal or plastic containers (verification cans, prover tanks, oilers, etc.)	0	1	litre		40,000
		2	10	litre		60,000
		11	20	litre		80,000
		21	50	litre		110,000
		51	100	litre		180,000
		101	200	litre		290,000
		201	500	litre		400,000
		501	1000	litre		580,000
		1001	2000	litre		620,000

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		From	To			
		2001	3000	litre		670,000
		3001	5000	litre		960,000
		5001	10000	litre		1,200,000
		10001	20000	litre		1,440,000
		20001	30000	litre		1,680,000
		30001	40000	litre		2,040,000
		40001		litre		50,000 for every additional 5,000 litres
(c)	Oil filling machines					120,000
(d)	Fat filling machines					120,000
(e)	Gas filling machines					120,000
4	Flow meters					
		0	50	litres/min		120,000
		51	500	litres/min		280,000
		501	1000	litres/min		520,000
		1001	1500	litres/min		720,000
		1501	3000	litres/min		960,000
		3001		litres/min		1,400,000
5	Dimensional Measures					
(a)	measuring tapes	0	5000	mm		80,000
		6000	10000	mm		120,000
(b)	callipers /depth & height gauges	0	30	mm		130,000
		31		mm	above 30 cm	160,000
(c)	micrometer gauges	0	300	mm		100,000
(d)	rulers & metre bars	0	300	mm		60,000
		301	500	mm		70,000
		501	1000	mm		80,000
		1001		mm	Above 100 mm	10,000 for every 200 mm
(e)	penetrometers			mm		80,000
(f)	Plug gauges			mm		80,000
(g)	Snap gauges			mm		80,000
(h)	other dimensions measures			mm		Classified according to the above

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No.	Equipment	Range/Capacity		Unit	Accuracy	Rate
		From	To			
						appropriately.
6	Viscosity & Density measures					
(a)	viscometers					
	Glass viscometers/ pycono-meters			1/s		100,000
	Rotating spindle viscometers			1/s		120,000
	Dropping sphere viscometers			1/s		120,000
(b)	density meters					
	Hydrometers			1/s		100,000
	Density cups			1/s		100,000
7	Thermometers					
(a)	Liquid-in-glass thermometers			Celsius		70,000
(b)	Temperature-gauges			Celsius		120,000
(c)	Thermal-couples + indicator			Celsius		140,000
(d)	Platinum Resistance thermometers			Celsius		140,000
8	Electrical measures					
(a)	Electrical meters Charge per each parameter requested			(W, A, V, C, Ω, etc.)		100,000
(b)	Conductivity meter					120,000
(c)	Battery capacity tester			A, V		190,000
(e)	Moisture meter					120,000
(f)	Equipment that do not fall under any specific lab (alcoholmeters, PH, lacto scan, etc					130,000
9	Pressure gauges					
(a)	Blood pressure testing machine			bar		60,000
(b)	Master gauges			bar		140,000
(c)	Industrial type			bar		100,000
(d)	Pressure balance			bar		510,000
10	Force and Torque					
(a)	torque wenches			Nm		120,000
(b)	Compression machines			N		160,000
11	Air flow measurements					
(a)	Air velocity equipment			m/s		160,000
(b)	Anemometers			m/s		160,000

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