

Appendix 6. List of Requested Equipment and Study Results

NATIONAL CALIBRATION LABORATORY (NCL)

No.	Description	Q'ty	Necessity		Propriety		Quantity		Frequency of use		Calibration				Replace/Add/New
			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
A. Electrical Calibration System															
A-1	Direct Voltage Reference Standard	1	primary standard of DC	○	-	○	1	1	1/m	5 hrs	2/y	1m	External	1,400	New
A-2	Resistance Standards (complete set all range)	1	primary standard of DC voltage. transfer standard (10 kΩ)	○	-	○	1	1	1/m	5 hrs	1/y	1m	External	700	New
A-3	Direct Voltage Standard	1	primary standard of DC transfer standard	○	-	○	1	1	1/m	5 hrs	1/y	1m	RSS		New
A-4	Oscilloscope Calibrator	1	calibration of A-6 7 11 13, 18 and outside items	○	-	○	1	1	3/w	5 hrs	1/y	1 d	RSS		New
A-5	DC Null Detector/ Ohm Meter	1	calibration of A-1, 3	○	-	○	1	1	2/w	3 hrs	1/y	5 h	RSS		New
A-6	Digital Multimeter	1	working standard	○	-	○	1	1							New
A-7	Spectrum Analyzer	1	measurement of RF equipment	○	⑨	×	-	-	2/w	4 hrs	1/y	1 d	RSS		New
A-8	Power Meter Calibrator	1	calibration of A-23	○	-	○	1	1	2/w	3 hrs	1/y	1m	External	490	New
(A-23)	Power sensor	1	measurement of telecomm equipment etc.	○	-	○	1	1	2/w	2 hrs	1/y	4 h	RSS		New
A-9	Power Supply	1	power for precise calibration	○	-	○	1	1	4/w	3 hrs	1/y	4 h	RSS		New
A-10	High Voltage Digital Voltmeter	1	testing of TV transformer.	○	-	○	1	1	2/w	3 hrs	1/y	4 h	RSS		New
(A-17)	High Voltage Probe	1	etc.	○	-	○	1	1	2/w	2 hrs	1/y	1m	External	280	New
A-11	1000A DC Current Source	1	testing of welding machine,	○	-	○	1	1	2/w	2 hrs	1/y	4 h	RSS		New
(A-12)	Current Probe	1	circuit breaker, etc.	○	-	○	1	1	2/w	2 hrs	1/y	1m	External	350	New
A-13	Function Generator	1	measurement of RF equipment	○	⑨	×	-	-	2/w	2 hrs	1/y	5 h	RSS		New
A-14	High Voltage Source	1	testing of TV transformer. etc	○	-	○	1	1	2/w	2 hrs	1/y	5 h	RSS		New
A-15	Microwave Frequency Counter	1	RF system	○	-	○	1	1	2/w	2 hrs	1/y	5 h	RSS		New
A-16	Variable Auto Transformer	1	transform for testing	○	⑧	×	-	-	2/w	2 hrs	1/y	3 h	RSS		New
A-18	Voltage Reference Divider (Scope Meter)	1	calibration of voltage	○	-	○	1	1	2/w	2 hrs	1/y	6 h	RSS		New
A-19	Standard Capacitances (1pF - 1000pF 4 kinds)	1	primary standard of capacitance	○	-	○	4 kinds 1 each	1	2/w	3 hrs	1/y	1m	External	280	New
								1	2/w	3 hrs	1/y	1m	External	280	
								1	2/w	3 hrs	1/y	1m	External	280	
								1	2/w	3 hrs	1/y	1m	External	280	
A-20	Decade Capacitor	1	primary standard of capacitance	○	-	○		1	2/w	4 hrs	1/y	1m	External	280	New

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			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD		
A-21	Standard Inductance (6 kinds)	1	primary standard of inductance	○	-	○	6 kinds 1 each	1	2/w	4 hrs	1/y	1m	External	280	New	
								1	2/w	4 hrs	1/y	1m	External	280		
								1	2/w	4 hrs	1/y	1m	External	280		
								1	2/w	4 hrs	1/y	1m	External	280		
								1	2/w	4 hrs	1/y	1m	External	280		
A-22	Global Positioning System with Time Interval Counter	1	primary standard of frequency	○	-	○	1	1	3/w	4 hrs	1/w	-	External	700	New	
A-24	Calibration Asset Track/Management Software	1	precise calibration and uncertainty evaluation	○	-	○	1	1	daily	cont.	N/A				New	
A-25	Multifunction Calibrator	1	calibration of A-6 and outside items	○	-	○	1	1	daily	cont.	1/y	1 d	RSS		Add	
B. Temperature Calibration System																
B-1	Water Bath	1	calibration of thermocouples	○	-	○	1	1	daily	cont.	1/y	3 h	RSS		New	
B-2	Fluid Bath	1		○	-	○	1	1	daily	cont.	1/y	3 h	RSS		New	
B-3	Fluid Bath	1		○	-	○	1	1	daily	cont.	1/y	3 h	RSS		New	
B-4	Salt Bath	1		○	-	○	1	1	daily	cont.	1/y	3 h	RSS		New	
B-5	Ice Point Reference	1	calibration of ice point	○	-	○	1	1	daily	cont.	1/y	1m	External		New	
B-6	Ice Machine with Crusher	1		○	-	○	1	1	daily	cont.	N/A				New	
B-7	Triple Point of Water Cell	1	primary standard of temperature	○	-	○	1	1	1/m	6 hrs	1/y		External	350	New	
B-9	Freezing Point of Indium Cell	1		○	-	○	1	1	1/m	6 hrs	1/y		External	350	New	
B-11	Freezing Point of Aluminum Cell	1		○	-	○	1	1	1/m	6 hrs	1/y		External	350	New	
B-12	Freezing Point of Tin Cell	1		○	-	○	1	1	1/m	6 hrs	1/y		External	350	New	
B-14	Freezing Point of Copper Cell	1		○	-	○	1	1	1/m	6 hrs	1/y		External	350	New	
B-15	Bath for Maintaining Triple Point of Water and Gallium Cells	1	for B-7	○	-	○	1	1	1/m	6 hrs	N/A				New	
B-16	Bath for Maintaining Indium, Tin, Zinc and Aluminum Cells	1	for B-9 11 12	○	-	○	1	1	1/m	6 hrs	N/A				New	
B-17	Bath for Maintaining Silver and Copper Cells	1	for B-14	○	-	○	1	1	1/m	6 hrs	N/A				New	
B-18	Dry Block Calibrator	2	calibration of dry block of pharmaceutical companies etc	○	-	○	higher and lower range 1 each	1	daily	6 hrs	1/y	8 h	RSS		New	
								1	daily	6 hrs	1/y	8 h	RSS		Add	
B-19	Spherical Furnace	1	calibration of thermocouples of food, pharmaceutical, cosmetic companies	○	-	○	1	1	3/w	8 hrs	1/y	8 h	RSS		New	
B-20	Humidity/Temperature Recorder	1	monitoring temperature and humidity	○	-	○	1	1	daily	cont.	1/y	1m	External	560	New	
B-21	Humidity/Temperature Chamber	1	calibration of humidity meter recorder etc	○	-	○	1	1	3/w	8 hrs	1/y	8 h	RSS		New	

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			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
B-22	Reference Standard Thermocouples and Resistance Thermometers	4	calibration of B-23	○	-	○	4 ranges 1 each	1	1/m	8 hrs	1/y	4 d	RSS		Add
								1	1/m	8 hrs	1/y	4 d	RSS		
								1	1/m	8 hrs	1/y	4 d	RSS		
								1	1/m	8 hrs	1/y	4 d	RSS		
B-23	Working Standard Thermocouples and Resistance Thermometers	4	calibration of furnace oven, etc	○	-	○	4 ranges 1 each	1	daily	cont.	1/y	2 d	RSS		New
								1	daily	cont.	1/y	2 d	RSS		
								1	daily	cont.	1/y	2 d	RSS		
								1	daily	cont.	1/y	2 d	RSS		
B-24	Digital Precision Thermometers	4	calibration of furnace, oven, etc.	○	-	○	4 kinds 1 each	1	daily	cont.	1/y	2 d	RSS		Add
B-25	Liquid In Glass Thermometers	10	calibration of thermometer	○	-	○	10 kinds 1 each	10	daily	cont.	1/y	4 d	RSS		Add
B-27	Clamps for holding thermometers and etc.	10		○	-	○		10							New
B-28	Cold Junction Comparison	1	comparison of thermocouples	○	-	○	1	1	3/w	6 hrs	N/A				New
B-29	Multiplexer Selector Switch	1		○	-	○	1	1	3/w	6 hrs	N/A				New
B-30	Pyrometer	1	measuring high temperature	○	⑨	×	-	-	3/w	3 hrs	1/y	1m	External	350	New
B-31	Portable Infrared calibrator (Black Spot)	1	equipment in plant etc	○	⑨	×	-	-	3/w	3 hrs	N/A				New
	C. Length Calibration System														
C-1	Gauge Block Set (1-100mm)	2	primary standard	○	-	○	1 set for the both primary and transfer standard	1	1/w	2 hrs	1/3y	1m	External	233	Add
C-2	Gauge Block Set (125-500mm)	2		○	-	○		1	1/w	2 hrs	1/3y	1m	External	333	Add
C-3	Gauge Block Set (0-5 inch)	2		○	-	○		1	3/d	2 hrs	1/y	2 d	External	700	New
C-4	Gauge Block Set (5-20 inch)	2		○	-	○		1	3/d	2 hrs	1/y	2 d	External	700	New
C-5	Angle Block Set (0-360°)	2	calibration of protractor	○	-	○	1 unit for external calibration then total 2 units	2	3/w	2 hrs	1/y	1m	External (1 unit)	700	New
C-6	Gauge Block Accessory Kit	2	handling and maintenance of	○	-	○	1 each	1	daily	2 hrs	n/a				New
(C-25)	Maintenance Kit for gauge blocks	2	gauge blocks	○	-	○		1	daily	daily	n/a				New
C-7	Caliper checker	2	calibration of caliper	○	-	○	2 each for frequent use	2	daily	4 hrs	n/a				New
C-8	Inside Micro Checker	2	calibration of inside micrometer	○	-	○		2	daily	4 hrs	n/a				New
C-9	Depth Micro Checker	2	calibration of depth micrometer	○	-	○		2	daily	2 hrs	n/a				New
C-10	Digital Tape Measure	2	working standard	○	⑧	×	-	-	3/w	3 hrs	1/y	1 d	RSS		New
C-11	Set of control glasses for parallelism	2	calibration of C-15	○	⑧	×	-	-	daily	3 hrs	n/a				New
								-	daily	3 hrs	n/a				
C-12	Black Granite Surface Plate and Tables	4	general use	○	-	○	1 unit	1	daily	daily	n/a				New
C-13	Optical Flat Set	2	calibration of micrometers	○	⑧	×	-	-	daily	3 hrs	n/a				New
								-	daily	3 hrs	n/a				
C-14	Digital Micrometer	4	general measuring	○	⑧	×	-	-	daily	2 hrs	1/y	3 h	RSS		New
								-	daily	2 hrs	1/y	3 h	RSS		
								-	daily	2 hrs	1/y	3 h	RSS		
								-	daily	2 hrs	1/y	3 h	RSS		
C-15	Digital Calipers	4	general measuring	○	⑧	×	-	-	daily	2 hrs	1/y	3 h	RSS		Add

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			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
C-16	Bore Gauges	4	measurement of inside	○	-	○	primary and working standard 1 each for 4 ranges	2	3/w	2 hrs	1/y	1m	External	280	New
								2	3/w	2 hrs	1/y	1m	External	280	
								2	3/w	2 hrs	1/y	1m	External	280	
								2	3/w	2 hrs	1/y	1m	External	280	
C-17	Digital Angle protractor	2	measurement of angle	○	⑧	×	-	-	3/w	1 hr	1/y	4 h	RSS		New
C-18	Micrometer stand	2	holding micrometer	○	⑧	×	-	-	daily	daily	n/a				New
C-19	Dial Gauge stand	2	holding dial gauge	○	⑧	×	-	-	daily	daily	n/a				New
C-20	Dial Gauge Tester	1	calibration of dial gauge	○	-	○	1	1	daily	daily	1/y	4 h	RSS		New
C-21	Precision Level	1	measurement of level	○	-	○	1	1	daily	daily	n/a				New
C-22	Granite Comparator Stand	2	measurement with C-27	○	-	○	2 for frequent use	2	daily	daily	n/a				New
C-23	Peak wide stand Microscope	1	precise measurement	○	⑧	×	-	-	daily	daily	n/a				New
C-24	Edge Scale for measurement of parallelism of vernier calipers	2	calibration of edge of caliper	○	-	○	2 for frequent use	2	daily	daily	n/a				New
C-26	Linear Scale (up to one meter steel)	2	general measurement	○	-	○	-	2	daily	daily	1/y	5 h	RSS		New
C-27	Automatic Gauge Block Comparator	1	calibration of C-1 -4	○	-	○	1	1	daily	3 hrs	n/a				New
C-28	Surface Roughness Tester	1	calibration of surface roughness	○	⑨	×	-	-	2/w	3 hrs	n/a				New
C-29	Machine for calibration of length standards steel rulers, etc.	1	calibration of length standards, steel rulers, etc.	○	-	○	1	1	3/w	6 hrs	1/y	1 d	RSS		New
C-31	Special Gauge Block Set for vernier caliper with control ring for inner diameter and height calibration	2	calibration of inner and depth measurement of caliper	○	-	○	1 set	1	1/w	2 hrs	1/y	1m	External	490	New
C-32	Plate for tempering gauge blocks	2	measurement of gauge blocks	○	-	○	2 for frequent use	2	daily	8 hrs	n/a				New
D. Mass Calibration System															
D-1	Weight Sets E1 Class with accessory kits	2	primary standard	○	-	○	1 for primary, 1 for transfer standard	2	1/m	7 hrs	1/5y	1m	External	700	New
D-2	Weight Sets E2 Class with accessory kits	2	working standard of mass for pharmaceutical production etc	○	-	○	1 for referential, 1 for working standard	2	3/w	6 hrs	1/y	3 d	RSS		Add
D-3	Weight Sets F1 Class with accessory kits	1		○	-	○	1	1	daily	4 hrs	1/y	3 d	RSS		Add
D-4	Weight Sets M1 Class with accessory kits	1		○	-	○	1	1	daily	6 hrs	1/y	3 d	RSS		New
D-5	Electronic Digital Balance (200g) with table	1	calibration of lower accurate weights	○	-	○	1	1	daily	cont.	n/a				New
D-6	Electronic Digital Balance (25kg) with table	1		○	-	○	1	1	daily	cont.	n/a				New
D-7	Electronic Digital Balance (60kg) with table	1		○	-	○	1	1	daily	cont.	n/a				New
D-8	Digital Balance Comparator (5g) with table	1	calibration of higher accurate weights	○	-	○	1	1	daily	cont.	n/a				New
D-9	Digital Balance Comparator (300g) with table	1		○	-	○	1	1	daily	cont.	n/a				New
D-10	Digital Balance Comparator (1200g) with table	1		○	-	○	1	1	daily	cont.	n/a				New
D-11	Digital Balance Comparator (10000g) with table	1		○	-	○	1	1	daily	cont.	n/a				New
D-12	Apparatus for Measuring Density of Weights with table	1	calibration of weights	○	-	○	1	1	1/w	8 hrs	n/a				New
D-13	Apparatus for Measuring Magnetic Susceptibility of Weights with table	1	calibration of weights	○	-	○	1	1	1/w	8hrs	n/a				New
D-14	Desiccator	1	drying outside weights	○	-	○	1	1	daily	cont	n/a				New
D-16	Humidity Controlled Cabinets	1	keeping weights in constant humidity	○	-	○	1	1	daily	cont	n/a				New

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			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method		Cost/y /JD
E. Pressure Calibration System															
E-1	Dead Weight Tester Complete with	2	primary pressure system	○	-	○	1 for both primary and working	1	1/m	8 hrs	1/3y	1m	External	233	New
E-2	Low and High Range Pressure Piston and	3		○	-	○	2 ranges 1 each	1							New
E-3	Weight Set high range 20-700 bar	1		○	-	○	1	1							New
E-4	Precision Pressure Gauge and Vacuum Gauge	4		working standard for pressure gauge, autoclave	○	-	○	1 for referential, 1 for working standard	2	3/w	2 hrs	1/y	1 d	RSS	
					⑧	×		-	3/w	2 hrs	1/y	1 d	RSS		
E-5	Hydraulic Digital Pressure Calibrators (Fluid and	2		○	-	○	1	1	daily	6 hrs	1/y	2 d	RSS		New
(E-10)	Fittings, Valves, & pressure tubes. (sets)	2		○	⑧	×	-	-							New
E-6	Vacuum Pump	1	calibration of vacuum pump	○	-	○	1	1	daily	6 hrs	n/a			New	
E-7	Vacuum Meter	1	working standard	○	-	○	1	1	2/w	3 hrs	1/y	1 d	RSS		New
E-8	Mercury Manometers	2	calibration of manometer	○	⑧	×	-	-	2/w	3 hrs	1/y	1 d	RSS		New
E-9	Barometer	1	atmospheric condition	○	-	○	1	1	daily	cont.	1/y	4 h	RSS		New
F. Force Calibration System															
F-2	Digital Force Read Out	2	reading of F-4 -9	○	-	○	1 for primary, 1 for transfer standard	2	4/w	6 hrs	1/y	1 m	External (1 unit)	350	Add
F-3	Reference Standard Machine for Calibration of Load Cells	1	calibration of F-4 -9	○	-	○	1	1	4/w	8 hrs	n/a				New
F-4	Load Cell / Compression & Tension	2	primary standard	○	-	○	1 for primary, 1 for transfer standard	2	4/w	6 hrs	1/2y	1m	External (1 unit)	175	New
F-5	Load Cell / Compression & Tension	2	transfer standard	○	-	○		2	4/w	6 hrs	1/2y	1m		175	New
F-6	Load Cell / Compression & Tension	2		○	-	○		2	4/w	6 hrs	1/2y	1m		175	New
F-7	Load Cell / Compression & Tension	2		○	-	○		2	4/w	6 hrs	1/2y	1m		175	Add
F-8	Load Cell / Compression & Tension	2		○	-	○		2	4/w	6 hrs	1/2y	1m		175	Add
F-9	Load Cell / Compression	2		○	-	○		2	4/w	6 hrs	1/2y	1m		175	New
F-10	Proving Rings / Compression & Tension	6	measurement of force	○	⑤	×		-	-	2/w	3 hrs	n/a			
F-11-A	Torque Calibration System	1	calibration of torque	○	-	○	1	1	1/w	4 hrs	1/y	1 d	RSS		New
F-11-B	Torque Transducer Calibration System	1		○	-	○	1	1	1/w	4 hrs	1/y	1m	External	280	
G. Volume & Density Calibration System															
G-1	Weighing Machine	1	general measuring	○	-	○	1	1	3/w	4 hrs	1/y	1 d	RSS		New
G-2	Balance	1	general measuring	○	-	○	1	1	3/w	4 hrs	1/y	1 d	RSS		New
G-3	Standard Flask	10	calibration of equipment for pharmaceutical cosmetic companies etc	○	-	○	1 set for 10 kinds	1	3/w	4 hrs	1/y	1m	External	280	New
G-4	Standard Pipette	10		○	-	○		1	3/w	4 hrs	1/y	1 d	RSS		New
G-5	Standard Burette	8		○	-	○		1 set for 4 kinds 2pcs	1	3/w	4 hrs	1/y	1 d	RSS	
G-6	Standard Tank	3		○	⑤	×	-	-	3/w	4 hrs	n/a			New	
G-7	Standard Hydrometer	1		○	-	○	1	1	3/w	4 hrs	1/y	1m	External	140	New
G-8	Specific Gravity Meter	1		○	-	○	1	1	3/w	4 hrs	1/y	1m	External	210	New
G-9	Temperature Bath	1		○	-	○	1	1	3/w	4 hrs	n/a			New	
G-10	Water Distillation Apparatus	1	producing pure water	○	-	○	1	1	3/w	4 hrs	n/a			New	
G-11	Manometer	1	measuring atmospheric condition	○	⑧	×	-	-	3/w	4 hrs	1/y	3 hrs	RSS		New
G-12	Plastic Tubing	1	transfer of water etc.	○	⑧	×	-	-	daily	cont.	n/a			New	

No.	Description	Q'ty	Necessity		Propriety		Quantity			Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD		
G-13	Dry Oven	1	drying items from outside	○	-	○	1	1	daily	cont	n/a					New
G-14	Pycnometer	1	measuring of density of solid materials	○	-	○	1	1	3/w	4 hrs	1/y	1m	External	350		New
G-15	Barometer	1	atmospheric condition	○	⑨	×	-	-	daily	cont.	1/y	4 h	RSS			New
G-16	Hydrometer	1	measuring gravity of liquid	○	-	○	1	1	3/w	4 hrs	1/y	1m	External	280		New
G-17	Desiccator	1	drying G-3 -5 etc.	○	-	○	1	1	daily	cont.	n/a					New
H. Flow Calibration System																
H-1a,b,c	Reference Standard and Working Flow Meters (Fluid)	1 set	reference standard and working flow meters for pharmaceutical, cement fertilizer companies	○	-	○	1 for referential, 1 for working standard	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		New
					-	○	8 kinds 2 sets	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		
					-	○	10 kinds 2 sets	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		
H-2a b	Reference Standard and Working Flow Meters (Air)	1 set	calibration of flow meters	○	-	○	1 for referential 1 for working standard, 2 ranges	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		New
								2	4/w	6 hrs	1/y	1m	External (1 unit)	350		
I. Speed Calibration System																
I-1a,b	Reference Standard and Working Tachometers	2 sets	reference standard and measurement of motors	○	⑧	×	-	-	4/w	6 hrs	1/y	1m	External (1 unit)	350		New
								-	4/w	6 hrs	1/y	1m	External (1 unit)	350		
I-2	Standard Apparatus for calibration of Tachometers	1	calibration of tachometers	○	⑧	×	-	-	4/w	6 hrs	1/y	n/a				New
J. Light Calibration System																
J-1	Reference Standard and Working Luxmeters	2	measurement of bulbs	○	-	○	1 for referential, 1 for working standard	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		New
J-2a	Reference Standard and working IR-meter	2		×	⑤⑥⑧	×	-	-	4/w	6 hrs	1/y	1m	External (1 unit)	350		New
J-2b	Reference Standard and working UV-meter	2		○	-	○	1 for referential, 1 for working standard	2	4/w	6 hrs	1/y	1m	External (1 unit)	350		
J-3	Standard Apparatus for calibration of Luxmeters	1	calibration of luxmeter	○	⑧	×	-	-	4/w	6 hrs	1/y	n/a				New

Annex ELECTRONIC SERVICES AND TRAINING CENTER (BSTC)

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use			Calibration			Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
I. Equipment needed for testing safety of Home Use Electronic Appliance																
1-1	Insulation and breakdown tester	1	insulation and breakdown test	IEC60335-1	○	-	○	1	1	15 /d	1/4h	1/y	3 d	RSS		Add
1-2	Leakage current meter	2	measuring leakage current	IEC60335-1	○	-	○	for 2 places	2	15 /d	1/4h	1/y	6 d	RSS		New
1-3	Ball pressure test set	1	ball pressure test	IEC60335-1	○	-	○	1	1	5 /d	1h	1/y	60 d	RSS		New
1-4	Spring operated impact hammer	2	strength test	IEC60335-1	○	-	○	2 for frequent use and long calibration period	2	15 /d	1/4h	1/y	60 d	External	1,000	New
1-5	Needle flame test apparatus	1	flame test	IEC60335-1	○	-	○	1	1	10 /d	1/2 h	1/y	3 d	RSS		New
1-6	Water pressure apparatus	2	water pressure test of washing machine etc.	IEC60335-2-7	○	-	○	1 from frequency	1	10 /w	1/2 h	1/y	3 d	RSS		New
1-7	Heating cabinet	2	Heating test	IEC60335-1	○	-	○	1 from frequency	1	20 /w	2 h	1/y	3 d	RSS		New
1-8	Proof tracking test apparatus	1	proof tracking test	IEC60335-1	○	-	○	1	1	10 /d	1/2 h	1/y	3 d	RSS		New
1-9	IP Rating Test equipment	1	IP rating test	IEC60335-1	○	-	○	1	1	10 /d	1/2 h	1/y	3 d	RSS		New
1-10	Creepage Gauge set	1	measuring creepage	IEC60335-1	○	-	○	1	1	15 /d	1/4h	1/y	3 d	RSS		New
1-11	Torque screw drivers/spanners	1	test of bolt/nut fixation	IEC60335-1	○	⑧⑨	×	-	-	15 /d	1/4h	1/y	60 d	RSS		Add
1-12	Inclined plane	1	stability test	IEC60335-1	○	⑧⑨	×	-	-	15 /d	1/4h	1/y	3 d	RSS		New
1-13	High frequency power supply	1	insulation test of microwave oven	IEC60335-2-25	○	-	○	1	1	10 /w	1/2 h	1/y	3 d	RSS		New
1-14	Door endurance tester for microwave ovens	1	door endurance test for microwave oven	IEC60335-2-25	○	-	○	1	1	2/m	12d	1/y	3 d	RSS		New
1-15	Hot winding ohmmeter	1	hot test	IEC60335-1	○	-	○	1	1	15 /w	2 h	1/y	3 d	RSS		New
1-16	Digital Tachometer	2	measuring fan rotation	IEC342-1	○	⑧⑨	×	-	-	10 /w	1/2 h	1/y	60 d	RSS		Add
1-17	Digital Power Meter	1	measuring power	IEC60335-1	○	-	○	1	1	15 /d	1/4h	1/y	60 d	External	500	Add
1-18	Digital Lux meter	1	measuring lamp	IEC60335-1	○	⑨	×	-	-	10 /w	1/2 h	1/y	60 d	RSS		New
1-19	Torque tester for lamps	1	Torque test for lamp	IEC60335-1	○	-	○	1	1	20 /w	1/2 h	1/y	60 d	RSS		New
1-20	Life cycling tester for lamps	1	Life cycling test for lamp	IEC60335-1	○	-	○	1	1	cont.	all day	1/y	3 d	RSS		New
1-21	- Rigid Test finger with Force meter	1	safety test of internal mechanism of products	IEC60335-1	○	-	○	1	1	10 /d	1/4h	1/y	60 d	RSS		New
	- Test Pin	1			○	-	○	1	1	10 /d	1/4h	1/y	3 d	RSS		New
	- Test Nail	1			○	-	○	1	1	10 /d	1/4h	1/y	3 d	RSS		New
	- Test probe	1			○	-	○	1	1	10 /d	1/4h	1/y	3 d	RSS		New
	- Jointed Test Finger with Guard	1			○	-	○	1	1	10 /d	1/4h	1/y	3 d	RSS		New
1-22	Variable transformers	2	power for test	IEC60335-1	○	-	○	1 unit due to large capacity	1	cont	all day			RSS		New
1-23	Resistance Battery	1	Ballast testing	IEC921	○	-	○	1	1	10 /w	3 h			RSS		New
1-24	Surface resistivity meter	1	surface resistivity test	EN1081	○	-	○	1	1	2 /w	1/2 h	1/y	3 d	RSS		New
1-25	Digital clamp-on Ammeters	2	measuring input current	IEC60335-1	○	⑧	×	-	-	10 /d	1/4h	1/y	3 d	RSS		New
1-26	Multimeters	5	test of luminaire	IEC60598-1	○	⑧	×	-	-	15 /d	1/4h	1/y	3 d	RSS		Add
1-27	RCL Meter	1	measuring resistance of cables etc.	IEC227 228	○	-	○	1	1	10 /w	1/2 h	1/y	3 d	RSS		New
1-28	Glass fibers insulation	2	thermal test of hair dryer	IEC60335-2-23	○	⑧⑨	×	-	-	10 /w	1/2 h			RSS		New
1-29	Test corner	1	thermal test of electric appliances	IEC60335-1	○	-	○	1	1	5 /d	1 h	1/y	1 day	RSS		New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use			Calibration			Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
2. Equipment needed for testing of Electric Irons																
2-1	Balance	1	weighing in thermal test	IEC60311	○	⑧	×	-	-	20 /w	1/2 h	1/y	2 d	RSS		Add
2-2	Circular blade crosscut tester	2	crosscut test	IEC60311	○	-	○	1 from frequency	1	20 /w	1/2 h			RSS		New
2-3	Steam pressure measuring apparatus	1	steam pressure measuring	IEC60335-2-3	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS		New
2-4	Apparatus for measuring temperature drop	1	measuring temperature drop	IEC60311	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS		New
2-5	Test apparatus for total steaming time	1	test of total steaming time	IEC60311	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS		New
2-6	Digital Thermometer with recording option	2	measuring temperature	IEC60311	○	-	○	2 from frequency	2	20 /w	3 h	1/y	3 d	RSS		Add
2-7	Fall Down Tester	1	fall down test	IEC60311	○	⑧⑨	×	-	-	20 /w	1 1/2 h	1/y	3 d	RSS		New
3. Equipment needed for testing of Switches, Plugs and Sockets																
3-1	Tumbling barrel	1	mechanical test of plug	IEC60884-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS		New
3-2	Pendulum impact test apparatus-mechanism	1	pendulum impact test of plug	IEC60884-1	○	-	○	1	1	20 /w	1/4h	1/y	5 d	External	500	New
(3-3)	Mounting device for impact test	1		IEC60884-1	○	-	○	1	1							New
(3-9)	Pendulum impact test apparatus-polyamide hammer	1		IEC60884-1	○	-	○	1	1							New
3-4	Apparatus for checking the withdrawal force	1	checking withdrawal force of plug	IEC60884-1	○	-	○	1	1	20 /w	1/4h	1/y	60 d	RSS		New
3-5	Apparatus for cord retention testing	1	cord retention testing	IEC60884-1	○	-	○	1	1	20 /w	1/4h	1/y	60 d	RSS		New
3-6	Impact Weight Apparatus with:	1	impact test of plug	IEC60884-1	○	-	○	1	1	20 /w	1/4h	1/y	60 d	RSS		New
	- Intermediate Piece for Low Temperature	1			○	-	○	1	1							New
	- Intermediate piece for Pin Insulating Sleeves	1			○	-	○	1	1							New
	- Falling Weight 1000g	1			○	-	○	1	1							New
	- Falling Weight 100 g	1			○	-	○	1	1							New
3-7	Intermediate piece for low temperature test	1			○	⑨	×	-	-							New
3-8	Intermediate piece for pin insulating sleeves	1			○	⑨	×	-	-							New
3-10	Mounting block for flush type equipment	1		IEC60884-1	○	⑨	×	-	-	20 /w	1/4h			RSS		New
3-11	Arrangement for mechanical strength test on multiple socket outlets	1	mechanical strength test on multiple socket outlets	IEC60884-1	○	⑧	×	-	-	20 /w	1/2 h	1/y	3 d	RSS		New
3-12	Apparatus for socket-outlets breaking capacity and normal operation test	1	socket-outlets breaking capacity	IEC60884-1	○	-	○	1	1	cont.	all day	1/y	3 d	RSS		New
3-13	Apparatus for flexing test	1	flexing test of plug	IEC60884-1	○	-	○	1	1	cont.	all day	1/y	6 d	RSS		New
3-14	Device for testing non-solid pins	1	testing non-solid pins	IEC60884-1	○	-	○	1	1	20 /w	1/2 h			RSS		New
3-15	Arrangement for compression test	1	compression test of plug	IEC60884-1	○	⑧	×	-	-	20 /w	1/2 h			RSS		New
3-16	Apparatus for plug pin abrasion test	1	plug pin abrasion test	IEC60884-1	○	-	○	1	1	cont.	all day	1/y	3 d	RSS		New
3-17	Tracking test apparatus	1	Tracking test of plug	IEC60884-1 IEC60112	○	⑧⑨	×	-	-	20 /w	1 h	1/y	3 d	RSS		New
3-18	Apparatus for pressure test at high temperature	1	pressure test of plug at high temperature	IEC60884-1	○	⑧	×	-	-	20 /w	1/2 h	1/y	3 d	RSS		New
3-19	Dynamometer	1	pull test of switch	IEC60669-1	○	⑧	×	-	-	30 /w	1/4h	1/y	60 d	RSS		New
3-20	Device for checking the resistance to lateral strain	1	resistance to lateral strain of socket	IEC60884-1	○	-	○	1	1	20 /w	1/2 h			RSS		New
3-21	4-step double programmable timer	1	breaking capacity for switch	IEC60669-1	○	-	○	1	1	20 /w	1 h					New
3-22	Programmable off switching counter	1			○	-	○	1	1	20 /w	1 h					New
3-23	Pneumatic drive unit	1			○	-	○	2 units necessary	2	20 /w	1 h					New
3-24	Test apparatus for making and breaking capacity for switches	1			○	-	○	1	1	cont.	all day	1/y	3 d	RSS		New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use			Calibration		Replace/ Add/New	
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method		Cost/y /ID
3-25	Conductor damage test set	1	Conductor damage test	IEC60884-1	○	-	○	1	1	20 /w	1/2 h	1/y	3 d	RSS	New	
3-26	Corrosion test apparatus	1	Corrosion test of plug	IEC60884-1	○	⑧	×	-	-	20 /w	1 h			RSS	New	
3-27	Endurance test system	1	Endurance test of switch	IEC60669-1	○	⑨	×	-	-	cont.	all day	1/y	3 d	RSS	New	
3-28	Gauge for Non-Accessibility Checking	1	safety test of socket	IEC60884-1	○	⑧	×	-	-	20 /w	1/4h	1/y	60 d	RSS	New	
3-29	Gauge for Non-Accessibility Checking after The Normal Operation Test	1		IEC60884-1	○	⑧	×	-	-	20 /w	1/4h	1/y	60 d	RSS	New	
3-30	Gauge for Verification of Grooves, Holes, and Reverse Tapers	1	verification of grooves, holes, and reverse tapers of socket	IEC60884-1	○	⑧	×	-	-	20 /w	1/4h	1/y	60 d	RSS	New	
3-31	Gauge for The Verification of The Outline of Covers or Cover-Plates	1	test of cover plate of socket	IEC60884-1	○	⑧	×	-	-	20 /w	1/4h	1/y	3 d	RSS	New	
3-32	Apparatus for compression test for verification of resistance to heat	1	Apparatus for compression test for verification of resistance to	IEC60884-1	○	-	○	1	1	20 /w	1 h	1/y	6 d	RSS	New	
3-33	AC current source	2	AC current source for switch test	IEC60669-1	○	-	○	1 unit due to large capacity	1	5 /d	1 h	1/y	3 d	RSS	New	
3-34	Inductive Loads:		power test of switch	IEC60669-1											New	
	- Air core inductor 100 mH, 25 A	1			○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS	New	
	- Air core inductor Imax 63 A, cosj max 0.6	1			○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS	New	
	Resistive Loads:														New	
	- Resistance Battery 10 kW	1			○	-	○	1	1	20 /w	1 h			RSS	New	
3-35	Tungsten Filament Lamp Loads	1	load for power test	IEC60669-1	○	⑨	×	-	-	20 /w	1 h			RSS	New	
4. Equipment needed for testing of Refrigerators, Freezers, and Bottle Coolers																
4-1	Multi-Channel Temperature Logger (PC Based Data Acquisition) with PC and software.	3	monitoring temperature in refrigerator etc.	ISO8187	○	-	○	2 from frequency	2	10 /w	4 5 h	1/y	3 d	RSS	New	
4-2	Test Packages with suitable filling materials (chemicals)	1	performance test	ISO8187	○	⑧⑨⑫	×	-	-	cont.	all day			RSS	New	
4-3	50/60 Hz Frequency Converter	1	general testing	ISO8187	○	-	○	1	1	cont.	all day			RSS	New	
4-4	Digital kWh Meter	2	testing power consumption	ISO8187	○	-	○	2 for frequent use and long calibration period	2	cont.	all day	1/y	60 d	External	1 000	New
4-5	Temperature and Humidity Chamber	1	high humidity high temperature test	ISO8187	○	-	○	1	1	cont.	all day	1/y	3 d	RSS	New	
4-6	Water Evaporation Apparatus	2	accumulation of frost	IEC335-2-24	○	-	○	1 from frequency	1	10 /w	2 h			RSS	New	

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration			Replace/ Add/New	
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method		Cost/y /JD
5. Equipment needed for testing of Lead Acid Starter Batteries																
5-1	Temperature Chamber	1	thermal test for battery	IEC60095-1	○	-	○	1	1	cont.	all day	1/y	3 d	RSS	Replace	
5-2	Vibration Tester	1	vibration test for battery		○	-	○	1	1	cont.	all day	1/y	3 d	RSS	Add	
5-3	High Rate Discharge Tester	1	discharge test		○	-	○	1	1	cont.	all day	1/y	3 d	RSS	Replace	
5-4	Universal Battery Tester	1	performance test		○	-	○	1	1	cont.	all day	1/y	3 d	RSS	New	
5-5	Water Bath	1	keeping temperature		○	-	○	1	1	cont.	all day	1/y	3 d	RSS	New	
6. Equipment needed for testing of Television Receivers																
6-1	Ionization meter	1	testing ionization	IEC60065	×	⑥⑧	×	-	-	20 /w	1/2 h	1/y	5 d	RSS	New	
6-2	Several special equipment for laser	1	laser classification	IEC60065	○	-	○	1	1	10 /w	1/2 h	1/y	60 d	External	500	New
6-3	Temperature recorder (multi-channel) with thermocouples	2	recording temperature of TV sets	IEC60065	○	-	○	2 from frequency	2	20 /w	4 h	1/y	3 d	RSS	New	
6-4	Pink noise generator	1	noise test	IEC60065	○	⑤⑨	×	-	-	20 /w	1 h	1/y	3 d	RSS	New	
6-5	Testing box	1	heating test	IEC60065	○	⑨	×	-	-	20 /w	4 h			RSS	New	
6-6	Band-pass filter for wide-band noise	2	noise test	IEC60065	○	⑨	×	-	-	10 /w	1/2 h	1/y	3 d	RSS	New	
6-7	Oscilloscope	1	measuring signals	IEC60065	○	-	○	1	1	20 /w	1 h	1/y	4 d	RSS	Add	
6-8	Softening temperature-testing equipment	1	high temperature test	IEC60065	○	-	○	1	1	20 /w	1/2 h			RSS	New	
6-9	Discharge meter	1	discharge test	IEC60065	○	-	○	1	1	20 /w	1/2 h	1/y	3 d	RSS	New	
6-10	Test finger (Test probe B of IEC 61032)	1	safety test	IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-11	Test pin (Test probe 13 of IEC 61032)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-12	Test pin (Diameter 4 mm , length 100 mm)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-13	Test pin (Test probe 16 of IEC 61032)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-14	Straight test probe (Test probe D of IEC 61032)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-15	Test probe C of IEC 61032	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
(6-36)	Test probe	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-16	Test hook (Fig 4 , 180 mm by 5 mm by 8 mm)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-17	Rigid test finger (Test probe 11 of IEC 61032)	1		IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	New	
6-18	Test tool	1	resistance of external forces	IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	60 d	RSS	New	
6-19	Surge test generator	1	surge test	IEC60065	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS	New	
6-20	Dielectric strength tester	1	high voltage test	IEC60065	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS	New	
6-21	Dielectric strength for sheet material test instrument	1	physical test	IEC60065	○	-	○	1	1	10 /w	1/2 h	1/y	3 d	RSS	New	
6-22	Spring hammer	1	impact test	IEC60065	○	⑩	×	-	-	20 /w	1/4h	1/y	60 d	External	500	New
6-23	Test plug	1	connecting test	IEC60065	○	⑧	×	-	-	10 /w	1/2 h	1/y	3 d	RSS	New	
6-24	Torque (fixings knobs screw terminals, strain relief of flexible cord)	1	torque test	IEC60065	○	⑨	×	-	-	40 /w	1/4h	1/y	60 d	RSS	New	
6-25	Pull / Push dynamometer	1	measurement of pull/push	IEC60065	○	⑧	×	-	-	20 /w	1/4h	1/y	60 d	RSS	New	
6-26	Antenna plug tester	1	antenna plug testing	IEC60065	○	⑧	×	-	-	10 /w	1/2 h	1/y	60 d	RSS	New	
6-27	Microscope	1	checking monitors	IEC60065	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS	Add	
6-28	Full draught oven	1	thermal test of TV sets	IEC60065	○	-	○	1	1	10 /w	1 h	1/y	3 d	RSS	New	
6-29	Endurance Test for switches	1	testing of switches	IEC60065	○	⑥	×	-	-	cont.	all day	1/y	3 d	RSS	New	
6-30	Flexing apparatus	1	testing of plugs	IEC60065	○	⑨	×	-	-	cont.	all day	1/y	3 d	RSS	New	
6-31	Test equipment for strain relief	1	strain test	IEC60065	○	⑨	×	-	-	10 /w	1/2 h	1/y	60 d	RSS	New	
6-32	Torque gauges	1	with No.24	IEC60065	○	⑧	×	-	-	20 /w	1/4h	1/y	60 d	RSS	New	
6-33	Inclined plane 10°	1	hazardous test	IEC60065	○	⑨	×	-	-	20 /w	1/4h	1/y	3 d	RSS	New	
6-34	Resistance to fire test equipment	1	testing of inner heating and fire	IEC60065	○	⑨	×	-	-	20 /w	1 h	1/y	3 d	RSS	New	

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New	
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD		
6-35	Oven	1	high temperature test	IEC60065	○	㊟	×	-	-								New
6-37	Video test signal generator	2	video test	IEC60107-1	○	-	○	2 for same time	2	20 /w	1 h	1/y	3 d	RSS			New
6-38	Audio test signal generator	1	audio test	IEC60107-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS			New
6-39	Teletext test signal generator	1	text test	IEC60107-1	○	㊟	×	-	-	20 /w	1 h	1/y	3 d	RSS			New
6-40	RF signal generator	1	undesired noise test	IEC60107-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS			New
6-41	Spectrum analyzer with digital frequency counting function	1	frequency analysis	IEC60107-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS			New
6-43	Video noise meter	1	video noise test	IEC60107-1	○	-	○	1	1	20 /w	1/4h	1/y	3 d	RSS			New
6-44	Vectorscope	1	checking video	IEC60107-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS			New
6-45	Audio level / distortion meter	1	distortion test	IEC60107-1	○	-	○	1	1	20 /w	1 h	1/y	3 d	RSS			New
6-46	Passive devices	1	performance test of TV	IEC60107-1	○	-	○	1	1	20 /w	2 h			RSS			New
6-47	Television test modulator	2	testing TV modulation	IEC60107-1	○	-	○	1 from frequency	1	20 /w	1 h	1/y	3 d	RSS			New
6-48	Low capacitance probe	3	incl. in No.6-7	-	-	-	-	-	-								New
6-50	Luminance meter and colorimeter with telescopic lens	1	testing of monitor	IEC60107-1	○	-	○	1	1	20 /w	1/2 h	1/y	60 d	RSS			New
6-51	Optical measurement instruments	1	optical measurement of monitor	IEC60107-1	○	㊟	×	-	-	20 /w	1/4h	1/y	60 d	RSS			New
7. Equipment needed for testing of Circuit Breakers																	
7-1	Short circuit current test set with all standard	1	short circuit test	IEC60898	○	-	○	1	1	20 /w	2 h	1/y	3 d	RSS			New
7-2	Mechanical shock test apparatus	1	mechanical shock test	IEC60898	○	-	○	1	1	20 /w	2 h	1/y	60 d	RSS			New
7-3	Glow wire test apparatus	1	flammable test	IEC60898	○	-	○	1	1	20 /w	1/2 h	1/y	3 d	RSS			New
7-4	Mounting support for mechanical impact test	1	impact test	IEC60898	○	㊟	×	-	-	20 /w	1/2 h	1/y	3 d	RSS			New
7-5	Mechanical impact test apparatus	1		IEC60898	○	㊟	×	-	-	20 /w	1/2 h	1/y	6 d	External	500		New
7-6	Uninterrupted duty test set with all	1	28 days test	IEC60898	○	㊟㊟	×	-	-	cont.	all day	1/y	3 d	RSS			New
7-7	Making and Breaking Tester	1	performance test	IEC60898	○	㊟㊟	×	-	-	cont.	all day	1/y	5 d	RSS			New

Annex MECHANICAL DESIGN AND TECHNOLOGY CENTER (MDTC)

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration			Replace/ Add/New	
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method		Cost/y /JD
1. Plastics & Rubber Unit																
1-1	Universal testing machine	1	extending test of plastic	ASTM D638M, ISO6259, ISO527	○	-	○	1	1	daily	7h	1/y	1h	RSS		Add
1-2	Melt flow indexer	1	testing viscosity of materials	ISO1133, ASTM D1238	○	-	○	1	1	daily	6h	1/y	1h	RSS		Replace
1-3	Analytical balance	1			○	-	○	1	1	daily	2h	1/y	1h	RSS		Replace
1-4	Forced circulation oven	1	aging test for PVC pipes etc	ISO2505, DIN8061, 8075, 16892	○	⑨	×	-	-	daily	24h	1/y	1h	RSS		Add
1-6	Computerized tensile film tester	1	Agricultural films, engineering films, etc.	ASTM D2103, ISO527, 4593	○	-	○	1	1	5/w	5h	1/y	1h	RSS		New
1-7	Sample preparation machine	1	preparation of samples	-	○	-	○	1	1	daily	2.5h					Replace
1-8	Dial gauge calipers	3	measurement of pipes	-	○	⑧	×	-	-	daily		1/y	1h	RSS		Add
1-9	Punch dies for plastic tensile samples	3	plastic tensile samples	ISO527-3	○	-	○	3 kinds 1 each	3	4-5/w		1/y	1h	RSS		Add
1-10	Certified mercury thermometers		measurement of temperature of samples													
1-10-	15°C -30°C ± 0.05°C	3			○	⑧	×	-	-	daily				RSS		New
1-10-	-15°C -15°C ± 0.05°C	4			○	⑧	×	-	-	daily				RSS		New
1-10-	20°C -80°C ± 0.1°C	4			○	⑧	×	-	-	daily				RSS		New
1-10-	70°C -120°C ± 0.1°C	4			○	⑧	×	-	-	daily				RSS		New
1-10-	110°C -150°C ± 0.1°C	4			○	⑧	×	-	-	daily				RSS		New
1-10-	170°C -220°C ± 0.1°C	4			○	⑧	×	-	-	daily				RSS		New
1-10-	-10°C to 30°C ± 0.1°C	4			○	⑧	×	-	-	daily				RSS		New
1-11	End caps for pressure testing of pipes	1	pressure test of pipe	ISO1167	○	⑥⑧⑨	×	-	-	daily				RSS		Add
2. Strength of Materials Unit																
2-1	Automated Universal tension/compression testing machine	1	tensile and compression testing of pipes, bars, plates	EN16002, ASTM370	○	-	○	1	1	daily	9h	1/y	1h	RSS		Replace
2-2	Analytical balance	1	testing of steel bars	EN10002, ASTM370	○	-	○	1	1	daily	10h	1/y	1h	RSS		Add
2-3	Thermocouple	1	measurement of temperature of objects	EN10002, ASTM370	○	-	○	1	1	1/w	10h	1/y	1h	RSS		New
2-4	Impact testing machine	1	impact testing of materials	ASTM E23等	○	-	○	1	1	1/w	10h	1/y	1h	Egypt	350	Add
2-6	Hydrostatic pressure tester	1	testing of pipes	ASTM A53/A53M	○	⑥⑨	×	-	-	1/w	20h	2/y	1h	RSS		Replace

No.	Description	Q'ty	Necessity			Propriety		Quantity			Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD		
3. Measurement & Calibration Unit																	
3-1	Digital height master	1	height measuring	-	○	-	○	1	1	5/w	2h	1/y	1h	RSS		New	
3-2	Ring gauge	1	circle measuring	-	○	⑤⑨	×	-	-	5/w	2h	1/y	1h	RSS		New	
3-3	Metric long series gauge block	1	length measuring	-	○	⑤⑨	×	-	-	5/w	2h	1/y	1h	RSS		New	
3-4	Procession steel cubes	1		-	○	⑤⑨	×	-	-	5/w	2h	1/2y	1h	RSS		New	
3-5	Calibrated steel balls	1	taper measuring etc.	-	○	-	○	1	1	5/w	2h	1/2y	1h	RSS		New	
3-6	Set of standard specimens for roughness tester	1	roughness measuring	-	○	⑤⑧⑩	×	-	-	0.5/w	0.5h					New	
3-7	Flow meters	1	flow measuring	-	○	⑤⑨	×	-	-	0.5/w	4h	1/y	1h			New	
3-8	Cement lining thickness gauge	1	cement lining thickness	-	○	⑧	×	-	-	3/w	6h	1/y	1h	RSS		New	
3-9	Digital balance	1	weighing object	-	○	-	○	1	1	20/w	5h	1/y	1h	RSS		New	
3-10	Digital balance	1		-	○	-	○	1	1	20/w	5h	1/y	1h	RSS		New	
3-11	Digital balance	1		-	○	-	○	1	1	20/w	5h	1/y	1h	RSS		New	
3-12	Ultrasonic thickness gauge (10mm)	1	thickness measuring	-	○	-	○	1	1	5/w	6h	each test		RSS		New	
3-13	Ultrasonic thickness gauge (100mm)	1		-	○	⑤⑨	×	-	-	5/w	6h	each test		RSS		New	
3-14	Coating and oxidation thickness gauge	1	coating and oxidation	-	○	-	○	1	1	10/w	3h	each test		RSS		New	
4. Metallography & Heat Treatment Unit																	
4-1-1	Scanning Electron Microscope with X-ray Analyzer	1	elemental analysis, micro analysis of metal	WI321/02, FQA,他	○	-	○	1	1	4/w	8h	2/y +daily	3 days	RSS		Replace	
4-1-2	CS Analyzer	1	CSN analysis	WI321/03, FQA,他	○	-	○	1	1	daily	10-20h	daily	each test	RSS		Replace	
4-2	Cutting Machine	1	sample preparation	-	○	-	○	1	1	daily	7h	-	-	-		Replace	
4-3	Grinding and polishing machines																
4-3-1	- Grinding: using twin wheel machine	1	sample preparation (rough)	-	○	-	○	1	1	daily	10h	-	-	-		Replace	
4-3-2	- Polishing: single wheel machine.	1	sample preparation	-	○	-	○	1	1	daily	10h	-	-	-		Replace	
4-4-1	Digital Universal Hardness Tester (Brinell, Vickers, and Rockwell)	1	testing hardness	ISO 6506, 6507	○	-	○	1	1	daily	10-15h	1/y	1d	Egypt	210	Replace	
4-4-2	Mini-load hardness (Micro-hardness) tester	1	testing hardness	WI 321/06	○	-	○	1	1	daily	5-10h	1/y	1d	Egypt	210	Replace	
4-5	Portable Spectrometer	1	elemental analysis	JS 441, FQA,他	○	-	○	1	1	1/w	6h	1/w	each test	RSS		New	
4-6	Carbon Sulphur Analyzer references material	16	carbon sulphur analysis	WI321/03, FQA,他	○	⑩⑬	×	-	-	daily	6-10h	-	-	-		New	
4-7	Universal Hardness Tester References Blocks	10	reference of universal hardness tester	ISO 6506, 6507 6508	○	-	○	1	1	daily	1-4h	-	-	-		Replace	
4-8	Electronic Balance	1	weighing testing materials	-	○	-	○	1	1	daily	1-3h	-	-	-		Replace	
4-9	Electric Furnace	1	heat treatment	ASTM F467 F468, 他	○	-	○	1	1	1/d	1h	1/y	1d	RSS		Replace	
4-10	Salt Spray Cabinet	1	salt spray test	ASTM G85 112	○	-	○	1	1	5/y	500h	1/y	1d	RSS		Replace	
4-11	Four pins meggar for measuring soil resistivity	1	testing condition of pipeline etc.	-	×	-	-	-	-	daily	1-4h	-	-	-		New	
4-12	Water Testing Kit, Portable	1	testing water in pipeline	-	×	-	-	-	-	daily	1-4h	-	-	-		New	
4-13	Automatic Mounting Press Machine for Sample	1	molding metal parts	-	○	-	○	1	1	daily	6-15h	-	-	-		Replace	

No	Description	Qty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
4-14	Lacquer Thickness Measurement	1	measurement of thickness of paints inside cans	JD 372	○	-	○	1	1	daily	1-4h	-	-	-	-	Replace
4-15	Oxygen meter computerized (portable)	1	testing water in pipeline	-	×	-	-	-	-	daily	1-4h	-	-	-	-	New
4-16	pH meter computerized (portable)	1		-	×	-	-	-	-	daily	1-4h	-	-	-	-	Replace
4-17	Cu/CuSO ₄ reference electrode computerized	1		-	×	-	-	-	-	daily	1-4h	-	-	-	-	New
4-18	Calomel & Ag/AgCl reference electrodes for	1		-	×	-	-	-	-	daily	1-4h	-	-	-	-	New
5. Thermal Testing Unit																
5-1	Establishing a facility (closed room) to test radiator	1	test of radiator etc	EN442, DIN4704	○	⑤⑨	×	-	-	2/w	1d	1/y	1d	RSS	-	Replace
5-2	Establishing a facility to test domestic gas cookers	1	test of domestic gas cookers	JS510, 511	○	⑤⑨	×	-	-	daily	1-4h	1/y	1d	RSS	-	Replace
6. Non-Destructive Testing Unit																
6-1	Directional X-Ray Machine for industrial radiography	1	checking welding results for pressure vessels, tanks, checking casting products, etc.	API1104 650 5L	○	-	○	1	1	2/w	6h	2/y	1d	RSS	-	Replace
6-3	Digital Ultrasonic Flow Detectors with probes	2	checking welding results for pressure vessels tanks etc	API1104 650 5L	○	-	○	2 from frequency of use	2	1/w	1d-2w	each test	30min	RSS	-	Replace
6-4	Digital Ultrasonic Thickness Gauge	2			○	-	○		1	2/w	1d-2w	each test	20min	RSS	-	New
7. Radiation Measurement and Calibration Lab.																
7-1	Low level Gamma Spectroscopy System	1	testing radioactive contamination of food.	ASTM E181	○	⑥	-	-	-	3-8/d	1-15h	1/d + 1/3m	1h + 1w	RSS	-	New
7-2	Gamma-Ray Spectroscopy Analysis Software	1	potash, salt, fertilizer animal feed	-	○	-	○	1	1	cont	-	-	-	-	-	New
7-3	Portable Gamma Spectroscopy System	1	above testing in vessels at port	ASTM E181	○	-	○	1	1	2/w	1d	1/3m	1w	RSS	-	Replace
7-4	Radon/Radon Daughter Detector	1	testing water, juice	ISO 10703	×	-	-	-	-	2/w	1d	1/3m	1w	RSS	-	New
7-5	Gross Alpha / Beta Counter	1	testing water, juice	JS286 1214 200	○	-	○	1	1	2-4/w	1d	1/3m	1w	RSS	-	Add
7-6	Neutron Dose / Dose Rate Meter	1	checking working environment etc	-	×	-	-	-	-	4-6/m	1d	1/2y	1w	SSDL	-	New
7-7	Four - input Multi - Channel Buffer	1	connection of Gamma spectroscopy system	-	×	-	-	-	-	cont	-	1/3m	1w	RSS	-	New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
9. Casting Technology Unit																
9-1	Portable Hardness Tester	1	hardness test of casting	ISO 6507	○	-	○	1	1	4/w	1h	1/w	1h	RSS		New
9-2	Induction Furnace	1	development and consultation for casting	AFS	○	-	○	1	1	3/w	8h	-	-	-		Add
9-3	Mobile Sand Testing Laboratory for foundry industry	1	testing of sand	AFS	○	-	○	1	1	1/m	3w	1/m	1d	RSS		New
9-4	Standardization and calibration kit for sand test specimens	1			○	Ⓢ	×	-	-	-	1/m	3w	1/m	1d	RSS	

Annex INDUSTRIAL CHEMISTRY CENTER (ICC)

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
1. Textile & Paper Unit																
1-1	Nu-Martindale Tester	1	Martindale abrasion test of textile	ASTM D4966 (ISO 3690)	○	-	○	1	1	20/m	2h	1/y	2h	RSS		Replace
1-2	Washing Machine	1	washing test of textile	ISO6330	○	-	○	1	1	40/m	2h	1/y	2h	RSS		Replace
1-3	Steaming Cylinder with Steam Generator	1	steaming test of textile	ISO3005	○	-	○	1	1	20/m	2h	1/y	2h	RSS		New
1-4	Air Permeability Tester of Paper	1	testing of air permeability of paper	ISO5636/5	○	-	○	1	1	10/m	2h	1/y	2h	RSS		Add
1-5	Driven Precision Yarn Reel Instrument	1	yarn counting of textile	ISO2060	○	-	○	1	1	30/m	3h	1/y	2h	RSS		Replace
1-6	Motor driven Water Penetration Tester	1	water penetration test of textile	ISO811	○	-	○	1	1	25/m	3h	1/y	2h	RSS		Add
1-7	Reflectometer	1	Determination of brightness etc of paper	ISO2469, 2471	○	-	○	1	1	40/m	2h	1/y	2h	RSS		Replace
1-8	Tensile Machine	1	tensile test of textile and paper	ISO13934, 2062. 1924-1	○	-	○	1	1	40/m	2h	1/y	48h	Egypt	1 000	Replace
2. Cigarettes Unit																
2-1	Smoking Machine	1	testing of quality of cigarettes	JS446	○	-	○	1	1	2/d	3h	1/y	2d	Mfr	5 000	Add
2-2	Gas Chromatograph	1	analyzing water of filter of cigarettes	ISO10362 10315	○	-	○	1	1	3/d	2h	each test	1h	RSS		Add
3. Organic & Food Unit																
3-1	Gas Chromatography/Mass Spectrometer (GC/MS)	1	chemical analysis of food especially for unknown components	AOAC JS	○	-	○	1	1	2-4/d	45min	1/d	45min	RSS		New
3-2	Gas Chromatography/Flame Ionization Detector (GC/FID)	1	testing of olive oil	JS 3, IOOC	○	-	○	1	1	8-10/d	20min	4/d	20min	RSS		Add
3-3	High Performance Liquid Chromatography (HPLC) (Semi-Preparative)	1	analysis of organic compounds	AOAC	○	-	○	1	1	10-15/d	15min	7-10/d	15min	RSS		Replace
3-4	Automatic Kjeldahl Nitrogen Analyzer	1	Nitrogen analysis of food	AOAC	○	-	○	1	1	1/d	7h	1/w	1h	AOAC		Add
3-5	Milk Analyzer	1	analysis of milk	JS837 121	○	-	○	1	1	5-10/d	2h	1/w				New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use			Calibration			Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
3-6	Meat Analyzer	1	analysis of meet	JS232	○	-	○	1	1	3/d	2h	1/w				New
3-7	Polarimeter	1	determination of sugar	AOAC(930.37)	○	-	○	1	1	10/d	3h	-				New
3-8	Titration Apparatus	1	general use	-	○	-	○	1	1	20/d	5h	-				Replace
3-9	Amino Acid Analyzer	1	Amino acid analysis	AOAC	○	-	○	1	1	1/d	2h	-				New
3-10	Automatic Melting Point Apparatus	1	measuring melting point of fat	AOAC(953)	○	-	○	1	1	4/d	2h	each test				New
3-11	Moisture Meter	2	moisture analysis of food	AOAC	○	-	○	1 from frequency	1	10/d	1h	1/d				New
3-12	Density Meter	1	measuring density of Ethanol	AOAC	○	-	○	1	1	5/d	2h	1/w				New
3-13	Muffle Furnace	1	measuring ash contents	AOAC	○	-	○	1	1	10/d	58h	1/y				Replace
3-14	pH/Ion Meter	1	general use	-	○	-	○	1	1	daily	3h	1/d				Replace
3-15	CHNO (Carbon-Hydrogen-Nitrogen-Oxygen)	1	analysis of organic compounds	AOAC	○	⊙	×	-	-	daily	3h	1/d				New
3-16	Food Lab System	1	testing acidity and peroxide number of oil	AOAC	○	⊙	×	-	-	20/d	6h	1/w				New
4. Petrol & Lubricants Laboratory																
4-1	Lubricant Test Machine	1	measurement of performance of lubricant	ASTM S2509, D2782	○	-	○	1	1	20/w	1h	1/w	1h			New
4-2	Dielectric Breakdown Voltage of Insulating Liquids	1	measurement of voltage of insulation	ASTMD877 D18186	○	-	○	1	1	50/w	0.5h	1/w	0.5h			New
4-3	Evaporating Loss of Lubricating Oils (Noack Test)	1	measurement of evaporating loss	ASTM D5800	○	-	○	1	1	160/y	3h	1/y	3h			New
4-4	Drop Test Apparatus	1	drop testing	IATA6 3 3	×	-	-	-	-	5/y						New
4-5	Determination of Vapor Pressure	1	measurement of vapor pressure	ASTMD323	○	-	○	1	1	10/w	3h	1/w	3h			New
4-6	Determination of Air Release Value	1	determination of air release value	ASTM D3427	○	-	○	1	1	100/y	3h	1/w	3h			New
4-7	Demulsibility Characteristics	1	demulsibility characteristics	ASTM D1401	○	-	○	1	1	160/y	2h	1/w	2h			New
4-8	Rapid Flash Point Tester	1	measurement of flash point	ASTM D3828	○	-	○	1	1	10/w	1h	1/w	1h			New
4-9	Automatic Oxygen Bomb Calorimeter	1	measurement of calorie	ASTM D240	○	-	○	1	1	150/y	5h	1/m	0.5h			Replace
4-10	Bench top XRF	1	determination of sulphur in oils, lead in gasoline, metal additives in lubricants	ASTM D1266, 2622 D3341, 3116	○	-	○	1	1	500/y	2h	1/y	2h			New
5. Paints, Lacquers & Solvents Laboratory																
5-1	Constant Climate Chamber	1	testing of paints	ISO3270	○	-	○	1	1	30/w	cont.	1/y	1d	RSS		New
5-2	Cone and Plate Viscometer	1	measurement of viscosity of paints etc	ASTM D4287	○	-	○	1	1	20/w	1h	1/m	1h	RSS		Add
5-3	Digital Constant Temperature Bath/Circulator & Cooler	1			○	-	○	1	1	10/w	2h	1/y	1d	RSS		New
5-4	Drying Time Recorder & Film Applicator	1	measurement of drying time	ASTM D5895	○	-	○	1	1	20/w	cont.	1/y	1d	RSS		New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use			Calibration			Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /ID	
5-6	Superchroma Spectro-colorimeter	1	measurement of color in factories	ISO7724	○	-	○	1	1	20/w	1h	1/y	1m	Mfr	1 000	New
5-7	Low Voltage Holiday Detector	1	holiday detection	ASTM G62	×	-	-	-	-	5/w	1h	1/y	1d	RSS		New
6. Inorganic Material Div.																
6-1	Atomic Absorption Spectrophotometer	1	analysis of metal contents	-	○	-	○	1	1	200/w	1/4h	each test	10min	RSS		Replace
6-2	XRD - (X-Ray Diffractometer)	1	Analysis of potash, phosphate, magnesium	ASTM C295 等	○	-	○	1	1	50/w	1h	-	-	-		New
6-3	Sequential Plasma Emission Spectrometer (ICP)	1	chemical analysis of water elements, i.e. Mo, B, Pd etc	-	○	-	○	1	1	50/w	1/2h	each test	10min	RSS		Replace
6-4	XRF- Sequential Spectrometer	1	elemental analysis of rocks metals alloys etc	-	○	-	○	1	1	200/w	1/2h	each test	10min	RSS		Replace

Annex BUILDING RESEARCH CENTER (BRC)

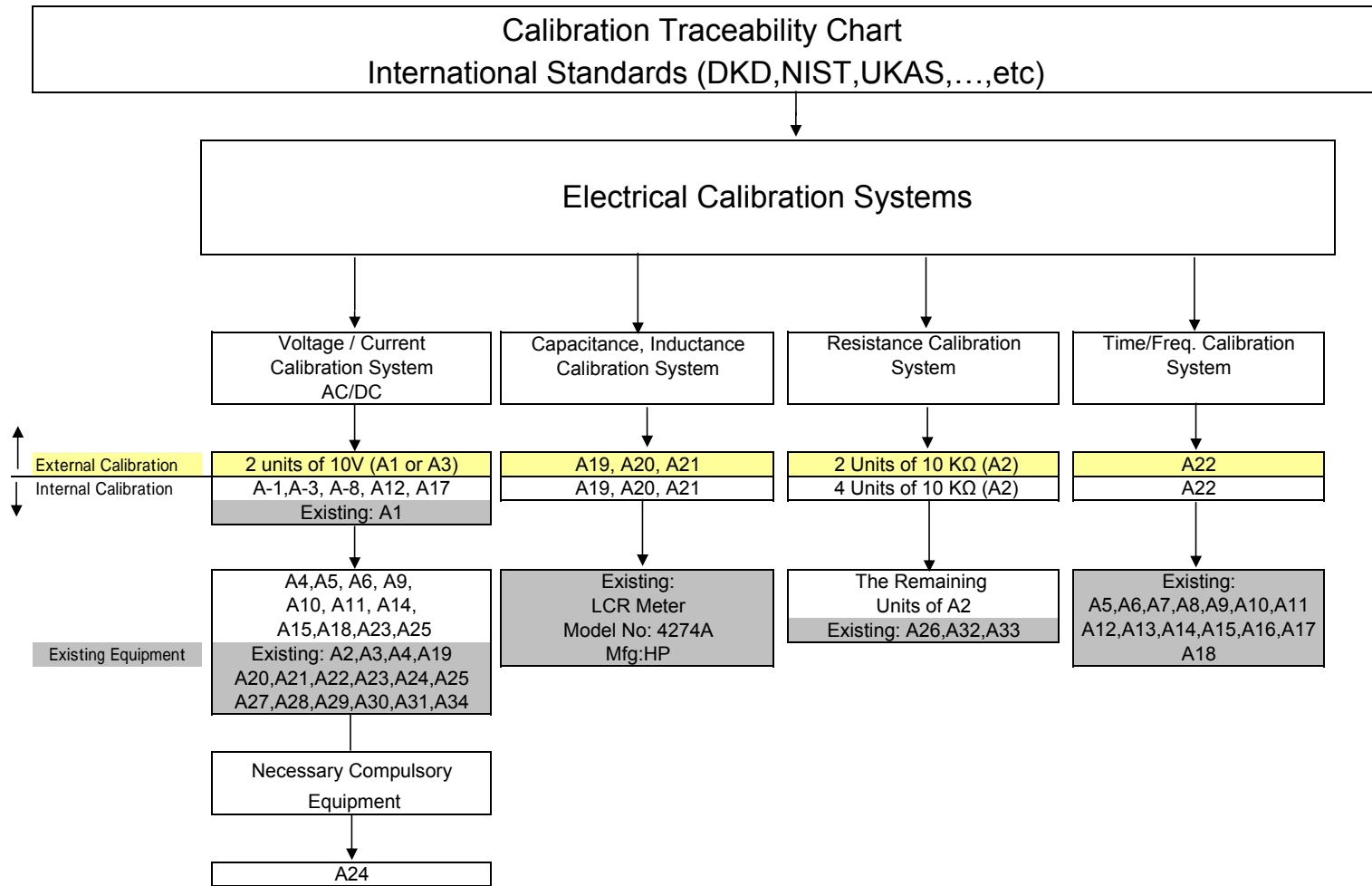
No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/Add/New
			Purpose of Use	Applicable standard	Result	I able 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
1	Triaxial apparatus, fully computerized according to BS 1377 and ASIM D 2850 standards.	1	testing fills etc. in soil unit	ASTM D2850	×	-	-	-	-	daily	5h	1/y	1/2d	RSS		Replace
2	Auto Test Compression/Flexural Machine	1	compression and flexural test in cement & concrete unit	ASTM C39, BS1881-116	○	-	○	1	1	daily	3h	1/y	1d	RSS		Replace
3	Guarded Hot Plate Apparatus	1	testing of insulation, stone bricks etc. in building components & insulation materials unit	ASTM C177	○	-	○	1	1	1/w	36h	1/y	1d	RSS		New
4	Accelerated Weathering Chamber	1	testing of building components against weather	ASTM G154	○	⊕	×	-	-	cont	24h	1/y				New
5	Equipment and Accessories to Test Sanitary Ware	1	testing of sanitary ware in ceramics unit	JS1222	○	-	○	1	1	daily	3h	1/y	1d	RSS		New
8	Non-Destructive Ultrasonic testing device	1	non-destructive ultrasonic test of concrete in cement & concrete unit	ASTMC697	○	-	○	1	1	daily	2h	each test	-	RSS		New
9	Water Permeability of Concrete	1	concrete impermeability of concrete in cement & concrete unit	DIN1048	○	-	○	1	1	1/w	48h	1/y	1/d	RSS		Replace

Annex ENVIRONMENTAL RESERCH CENTER (ERC)

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD	
1	Multi stage Cyanide Distillation System	1	CN analysis of bottled water, food etc in chemical analysis lab	JS200, 286 1214, AOAC	○	-	○	1	1	4/w	3h	-	-	-	-	Replace
2	Ion Chromatograph	1	Cation and anion (NOx, SOx, F, PO4, etc.) detection of olive oil etc in chemical analysis lab	JS200 286 1214, AOAC, JS3, IOOC	○	⑨	×	-	-	5/w	8h	-	-	-	-	Add
3	Purge & Trap Concentrator	1	with No.6,7 PCB, Dionex	JS286 etc.	○	-	○	inclu. in No 6	-	20/d	1h	1/d	2h	RSS	-	New
4	Precision Integrated Sound Level Meter/Noise Dosimeter	1	measuring noise of working conditions	Low in 1997	×	-	-	-	-	6/m	-	each test	1/2h	RSS	-	New
5	Environmental Cabinet Assembly	1	testing resistance to growth of mold on the surface of interior coatings	Low in 1997	○	-	○	1	1	cont.	-	-	-	-	-	New
6	Gas Chromatograph/Electron Capture Detector (GC/ECD)	1	with No 3,7 analysis of additives in foods micro g level in env and organic lab	JS200 286, 1214, AOAC JS3, IOOC	○	-	○	1	1	3/d	1h	2/y	1d	RSS	-	Add
7	Rotary Evaporator System	1	with No.3,6		○	-	○	1	1	3-6/d	15min	2/y	1d	RSS	-	New
8	Total Kjeldahl Nitrogen Digester/Distillator	1	detection of nitrogen of irrigation water, soil, fruit in chemical analysis lab	JS549	×	⑨	×	-	-	4/w	5h	-	-	-	-	Replace
9	Different equipments to establish a new soil analysis laboratory including: Soil Mill accompanied with	1	testing of soil for agriculture in chemical analysis/soil analysis lab.		×	-	-	-	-	1/w	1h	-	-	-	-	New
	i - 2mm Sieve sheet	1			×	-	-	-	-	-	-	-	-	-	-	New
	ii - Replacement brush strips	1			×	-	-	-	-	-	-	-	-	-	-	New
	iii- Dust collection system	1			×	-	-	-	-	-	-	-	-	-	-	New
	" Shaker	1			×	-	-	-	-	5/w	2h	-	-	-	-	New
	" Analytical Balance	2			×	-	-	-	-	5/w	2h	1/y	-	RSS	-	New
	" Oven	1			×	-	-	-	-	5/w	8h	1/y	-	RSS	-	New
	" Ultrasonic batch cleaner	1			×	-	-	-	-	5/w	1h	-	-	-	-	New
" Fume hood	1			×	-	-	-	-	5/w	8h	-	-	-	-	New	
10	Occupational Air Quality Portable Analyzer	1	measurement of working conditions	Bi-Law No 943 JS1189	×	-	-	-	-	6/m	-	1/m	1h	RSS	-	New
11	Occupational Volatile Organic Compounds (VOC's) Portable Analyzer	1	measurement of VOC in working conditions	Bi-Law No 943 JS1189	×	-	-	-	-	6/m	-	1/m	1h	RSS	-	New

No.	Description	Q'ty	Necessity			Propriety		Quantity		Frequency of use		Calibration				Replace/ Add/New	
			Purpose of Use	Applicable standard	Result	Table 2-1	Result	Necessary Quantity	Plan	Times	h/time	Times	h/time	Method	Cost/y /JD		
12	Provision of up-to-date Windows Operated Software	1	Simulation of air pollution for assessment	-	×	-	-	-	-	6/y							New
13	Continuous Fine Dust Monitor	1	monitoring fine dust of mining industry etc	JS1140 JS1189	×	-	-	-	-	24h/d	156/y	1/12 samples	1h	RSS			New
14	Dynamic Gas Calibration System	1	calibration for No 10 and 11	Bi-Law No 943 JS1189	×	-	-	-	-	6/w							New
15	Primary Roots Meter Calibrator	1	calibration for No. 13	JS1140 JS1189	×	-	-	-	-	1/2m							New
16	Fluorescent EDX	1	analysis of powder materials (cement, pharmaceutical products etc)	JS1189	×	-	-	-	-	4/w		each test					New

Appendix 7. Calibration Traceability Chart



Appendix 8. List of Applicable Standards

I. Electronic Service and Training Center

1. Equipment for testing safety of Home Use Electronic Appliance

IEC 60335-1 : Safety of household and similar electrical appliances

IEC 60335-2-7 : Safety of washing machine

IEC 60335-2-25 : Safety of microwave oven

IEC 60335-2-23 : Safety of skin for hair care

IEC 342-1 : Electric fans

EN 1081 : Resistance to earth of anti-statics

IEC 60598-1 : Safety of luminare

IEC 228 : Capacitance, inductance

IEC 227 : Cable & wires

2. Equipment for testing of Electric Irons

BS 3999-7 : Method of measuring the performance of household electrical appliances
part 7 - Electric irons

IEC 60335-2-3 : Safety of electric irons

IEC 60112 : Tracking test apparatus

3. Equipment for testing of Switches, Plugs and Sockets

IEC 60669-1 : Safety & performance of switches

IEC 60884-1 : Safety & performance - plugs & socket

4. Equipment for testing of Refrigerators, Freezers, and Bottle Cooler

ISO 8187 : refrigerating appliances and ice-makers

IEC 60335-2-24 : Safety of refrigerating appliances and ice-makers

5. Equipment for testing of Lead Acid Starter Batteries

IEC 60095-1 : General requirement and methods of test lead-acid starter batteries

6. Equipment for testing of Television Receivers

IEC 60065 : Audio, video and similar electronic apparatus - safety requirements

IEC 60107-1 : Methods of measurement on receivers fir television broadcast transmissions

7. Equipment for testing of Circuit Breakers

IEC 60898 : Electrical accessories - circuit-breakers for over-current protection for
household and similar installations

II. Mechanical Design and Technology Center

1. Plastics & Rubber Unit

- ASTM D638M : Test method for tensile properties of plastics (metric)
- ISO 6259 : Thermoplastic pipes - determination of tensile properties
- ISO 527 : Plastics - determination of tensile properties
- ISO 1133 : Plastics - determination of the melt mass-flow rate (MFR) and the melt volume flow-rate (MVR) of thermoplastics
- ASTM D1238 : Test method for flow rates of thermoplastics by extrusion plastometer
- ISO 2505 : Thermoplastic pipes; longitudinal reversion
- DIN 8061 : Unplasticized polyvinyl chloride pipes (PVC-U) - general quality requirements and testing
- DIN 8075 : High density polyethylene pipes (PE-HD) - general quality requirements and testing
- DIN 16892 : Crosslinked polyethylene (VPE) pipes - general quality requirements and testing
- ASTM D2103 : Standard specifications for polyethylene films and sheeting
- ISO 4593 : Film and sheeting - determination of thickness by mechanical schanning
- ISO 1167 : Thermoplastic pipes for the conveyance of fluids-resistance to internal pressure - test method

2. Strength of Materials Unit

- EN 10002 : Metallic materials - tensile testing
- ASTM 370 : Standard test methods and definitions for mechanical testing of steel products
- ASTM E23 : Standard test method for notched bar impact testing of metallic materials
- ASTM A53/A53M: Standard specifications for pipes, steel, black and hot-dipped zinc-coated, welded and seamless

4. Metallography & Heat Treatment Unit

- WI 321/02 : Documented in-house method - Elemental analysis using SEM
- WI 321/03 : Documented in-house method - Carbon and sulphur content using combustion techniques
- FQA : Fastener Quality Act
- ISO 6506 : Hardness test - Brinell
- ISO 6507 : Hardness test - Vickers
- ISO 6508 : Hardness test - Rockwell
- JS 441 : Metallography - chemical analysis
- WI 321/06 : Documented in-house method - Micro-hardness test
- ASTM G85 : Standard Practice for Modified Salt Spray (Fog) Testing

- ASTM 112 : Standard Guide for Conducting Exfoliation Corrosion Tests in Aluminum Alloys
- ASTM F467 : Standard Specification for Nonferrous Nuts, for General Use
- ASTM F468 : Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
- JS 372 : Tin sheets and cans tests
5. Thermal Testing Unit
- EN 442 : A course in structural design theory and practice
- DIN 4704 : Radiators : testing methods for radiators - regulations
- JS 510 : Cooking appliances - testing methods for domestic cooking appliances
- JS 511 : Domestic cookers - domestic cookers for use with liquefied petroleum gases
6. Non-Destructive Testing Unit
- API 1104 : Standards for welding pipelines and related facilities
- API 650 : Welded steel tanks for oil storage
- API 5L : Specification for pipeline
7. Radiation Measurement and Calibration Laboratory
- ASTM E181 : Standard testing method of detector - calibration and analysis of radio-nuclides
- ISO 10703 : Water quality - determination of activity concentration of radio-nuclides by high resolution gamma-ray spectrometry
- JS 286 : Potable water
- JS 1214 : Bottled water
- JS 200 : Natural mineral water
9. Casting Technology Unit
- AFS : American Foundry Society
- ISO 6507 : Hardness test - Vickers

III. Industrial Chemistry Center

1. Textile & Paper Unit

- ASTM D4966 : Abrasion resistance of textile fabrics (Martindale abrasion tester method)
- ISO 6330 : Textiles - domestic washing and drying procedures for textile testing
- ISO 3005 : Textiles - determination of dimensional change of fabrics induced by free steam
- ISO 5636/5 : Paper & paperboard - determination of air permeability of paper and board
- ISO 811 : Textile fabrics - determination of resistance to water penetration
- ISO 2469 : Paper & paperboard - measure of diffuse reflectance factor
- ISO 2471 : Paper & paperboard - measure of opacity - diffuse reflectance method
- ISO 13934 : Textiles - tensile properties of fabrics
- ISO 2062 : Yarns from packages - determination of single end breaking force
- ISO 1924-1 : Paper & paperboard - determination of tensile properties

2. Cigarettes Unit

- JS 446 : Cigarettes
- ISO 10362 : Cigarettes - Determination of water in smoke condensates
- ISO 10315 : Cigarettes - Determination of nicotine in smoke condensates - Gas-chromatographic method

3. Organic & Food Unit

- AOAC : Official method of analysis of the Association of official analytical chemists
- JS 3 : Fats and oils - olive oil & olive - pomace oil
- IOOC : International olive oil council (Trade standard applying to olive oil and olive - pomace oil (COI/T.15/NC no.2 rev.11))
- JS 837 : Infants and children food - Follow up formula
- JS 121 : Milk and milk products - milk powder and cream powder
- JS 232 : Meat and meat products - Canned corned beef

4. Petrol & Lubricants Laboratory

- ASTM D2509 : Extreme pressure properties of lubricating greases
- ASTM D2782 : Extreme pressure properties of lubricating fluids
- ASTM D877 : Dielectric breakdown voltage of insulating liquids
- ASTM D1816 : Dielectric breakdown voltage of insulating oils of petroleum
- ASTM D5800 : Testing lubricants determining the evaporation loss of lubricating oils
- IATA 6.3.3 : Drop test
- ASTM D323 : Standard test method for vapor pressure of petroleum products (Reid Method)
- ASTM D3427 : Standard test method for air release properties of petroleum oils

ASTM D1401 : Standard test method for water reparability of petroleum oils and synthetic fluids

ASTM D3828 : Standard test method for flash point by small scale closed tester

ASTM D240 : Standard test method for heat of combustion of liquid hydrocarbon fuels by bomb calorimeter

ASTM D1266 : Standard test method for sulfur
D2622

ASTM D3341 : Standard test method for Gasoline
D3116

5. Paints, Lacquers & Solvents Laboratory

ISO 3270 : Paints and varnishes and their raw materials - temperatures and humidifies for conditioning and testing

ASTM D4287 : Standard test method for high-shear viscosity using a cone/@late viscometer

ASTM D5895 : Standard test method for measuring times of drying or curing during film formation of organic coatings using mechanical recorders

ISO 7724 : Paints and varnishes - colorimetry

ASTM G62 : Standard test method for holiday detection in pipeline coating

6. Inorganic Material Division

ASTM C295 : Standard practice for petrographic examination of aggregates for concrete

IV. Building Research Center

- ASTM D2850 : Standard test method for unconsolidated-undrained triaxial compression on cohesive soils
- ASTM C39 : Test method for compressive strength of cylindrical concrete specimens
- BS 1881-116 : Method for determination of compressive strength of concrete cubes
- ASTM C39 : Standard test method for steady-state heat flux measurements and transmission properties by means of the guarded-hot-plate apparatus
- JS 1222 : Sanitary installations
- ASTM G154 : Standard practice for operating fluorescent light apparatus of nonmetallic materials
- ASTM C597 : Standard test method for pulse velocity through concrete
- DN 1048 : Testing of hardened concrete

V. Environmental Research Center

- JS 200 : Water - natural mineral water
- JS 286 : Water - drinking water
- JS 1214 : Water - bottled drinking water
- JS 549 : Fruits (fresh) - dates
- Bi-Law No.943 : Workers exposure limits to chemical substances
- JS 1140 : Pollutants - Ambient air quality standards
- JS 1189 : Pollutants - maximum allowable limits of air pollutants emitted from the stationary sources
- AOAC : Official method of analysis of the Association of official analytical chemists
- JS 3 : Fats and oils - olive oil & olive - pomace oil
- IOOC : International olive oil council (Trade standard applying to olive oil and olive - pomace oil (COI/T.15/NC no.2 rev.11))