Mechanical Design & Technology Center
Plastics & Rubber Lab

No.	Description	Qty
Mechanical Design & Technology Center		
Plastic & Rubber Lab.		
MEP-1	Universal testing machine (computerized) **according to ISO 7500 or equivalent**(Voltage 220-230V) or 380-3 phase) **with two load cells (5000N, 15000N)** with grips for 1) rubber and 2) Plastics and **3)grips for plastics from12mm to 30 mm thickness**. The grips for plastic shall fit a sample thickness of up to 14 mm. The extension measurement shall be based on bench marks and not on grip separation. It **is**, therefore, needed to supply an external extensometer with plotter or recorder and with calibration certificates	1
MEP-2	Melt flow indexer (voltage required is 220V-230V) according to ISO1133 and ASTM 1238, **complete with weights & cleaning tools and spare parts for nozzle, piston & cylinder**	1
MEP-3	Analytical balance 220V	1
MEP-4	Forced circulation oven (Temp. variation ± 1° C or better for rubber ageing) **according to DIN 50011 or equivalent**. The offered oven in the catalogue does not meet the standard requirements for temperature fluctuations.	
MEP-6	Computerized tensile film tester **up to 500 N capacity** ,900-1000 mm effective grip Separation is required. The extension measurement shall be based on bench marks and not on grip separation. It is, therefore, needed to supply an external extensometer with plotter or recorder and with calibration certificates Required voltage 220 or 380 V (three phase)	1
MEP-7	Sample preparation machine (lathe). Required speed is 10,000-25,000 rpm Variable speed . voltage (220-380V)	1
MEP-8	Dial gauge calipers according to ISO 3126. The gauges in the catalogue do not fit the standard , please see attached model from Mitutoyo model DCG0-20PM code 209-607 serial 13 9233for pipe wall thickness (ball end)	3
MEP-9	Punch dies for plastic tensile samples (not punching machine) .The required dies are Type I & IV according to ASTM D638 **and types 1B, 2,5 according to ISO 527-3**	3
MEP-10	Certified mercury thermometers in the approximate ranges shown below. Calibration certificates are required	
MEP-10 -1	15°C –30°C ± 0.05°C	3
MEP-10 -2	15°C –15°C ± 0.05°C	4
MEP-10 -3	20°C –80°C ± 0.1°C	4
MEP-10 -4	70°C -120°C ± 0.1°C	4
MEP-10 -5	110°C -150°C ± 0.1°C	4
MEP-10 -6	170°C -220°C ± 0.1°C	4
MEP-10-7	**-10°C to30°C ± 0.1°C**	**4**
MEP-11	**End caps for pressure testing of pipes according to ISO 1167 type A &B (160mm, 180mm, 200 mm,225mm,)**	

Mechanical Design & Technology Center
The Strength of Materials Lab

The Strength of Materials Lab.		Qty
MES-1	Automated **Universal** tensile/compression testing machine **1000** KN according to ISO 7500/1 with compression platens & bending device and grips and all needed accessories . 3 phase 380 V. Maximum distance between grips is required to be 1000 mm Main Unit accuracy and, design shall be according to ISO 7500-1 Cycle test control mode Data Processing Unit DTF System Extensometer (based on bench marks) Amplifier for DTF system extensometer and printer	
MES-2	Analytical balance SB 24001	1
MES-3	Thermocouple. A calibration certificate for all ranges is required.**Range –100 °C to 100 °C**	1
MES-4	Impact testing machine . Voltage required 220-230 V or 3 phase 380 V .The offered model CI300 is built according to JIS standards. We need the model ASCI 360 according to ASTM E 23 which is the used method in the lab. The offered model for constant immersion device does not provide the required temperature range for impact testing (- 100 to 100 °C)	1
MES-5	**Digital camera for photographing samples in the lab and onsite is needed . With coloured printer to be attached to a computer**	1
MES-6	**Hydrostatic pressure tester up to 700 bars for metal pipes with water bath with safety precautions in case of burst**	**1**

Mechanical Design & Technology Center
Measurement & Calibration Laboratory

No.	Description	Qty
1	Dogmatic height master	1
2	Step gauge for CMM	1
3	Gauge block set (Grade 0)	1
4	Ring gauge (5mm – 300m) step 5mm	1
5	Combination length bar	1
6	Combination angle gauge	1
7	Metric long series gauge block	1
8	Procession steel cubes	1
9	Calibrated steel balls	1
10	Standard specimens for roughness tester	1
11	Air conditioning unit with humidity controller	1
12	Flow meters	1
13	Gauge block comparator	1
14	Weight comparator	1
15	Cement lining thickness gauge	1

Mechanical Design & Technology Center
Metallography & Heat Treatment Lab.

No.	Description	Qty
1	- Scanning Electron Microscope with:- EDX (Energy Despersive X-ray) microanalysis. - WDX (Wave length Despersive X-ray) For microstructure and chemical characterization of metal and fractography.	1
2	Cutting Machine: For cutting small samples or specimens from large piece.	1
3	Grinding and polishing machines. Grinding: using twin wheel machine Polishing: single wheel machine. Consumables for grinding and polishing machines Emery papers with different grits for grinding machine Micro-cloth, different pastes and lubricant for polishing machine	1
4	Digital Universal Hardness Tester (Brinel, Vickers, and Rockwell)	1
5	Portable Spectrometer For quick Chemical analysis for metallic alloys on site	1
6	Carbon Sulphur analyzer references material: To be used for calibration purposes of carbon/ Sulphur analyzer.	16

No.	Description	Qty
7	Universal Hardness Tester References Blocks: Reference blocks to be used for calibration of the universal hardness tester from time to time.	10
8	Electronic Balance 0-1500 g: Resolution 0.001 g	1
9	Electric Furnace: For (Carborizing, Nitriding, Quench hardening, Normalizing, and Annealing) Heat treatment.	1
10	Salt Spray cabinet according to ASTM	1
11	Four pins meggar for measuring soil resistivity	1
12	Water Testing Kit, Portable: LaMotte 1956 (24 parameters)	1

Mechanical Design & Technology Center
Thermal Testing Lab.

No.	Description	Qty
1	Establishing a facility (closed room) to test radiator according to EN 442	1
2	Establishing a facility to test domestic gas cookers according to Jordanian Standards JS 510 & 511	1
	Temperature Sensory	4
4	PC + printer	2

Mechanical Design & Technology Center

No.	Description	Qty
1-	**The Non-Destructive Testing Lab.**	
	- Directional X-Ray machine for industrial radiography 200kv 8 mAmP. **Portable unit – for site testing, complete with stands**	1
	- Directional X-Ray machine for industrial radiography 300kv, 5 mAmP	1
	- Digital Ultrasonic flaw detectors with probes for testing of welds and casting.	2
	- Digital Ultrasonic thickness gauges	2
2-	**Radiation Measurement and calibration Lab.**	
	- Low level Gamma spectroscopy system	1
	- **Gamma – Ray spectroscopy analysis software**	1
	- Portable Gamma spectroscopy system	1
	- Radon / Radon daughter detector	1
	- Gross Alpha / Beta Counter.	1
	- **Neutron Dose / Dose Rate Meter**	1
	- **Four – input Multi – Channel Buffer**	1
3-	**Personal Dosimetry Lab.**	1
	- **Automatic TLD Reader Harshow 6600**	500
	- **TLD Cards (^{7}LiF:Mg:Ti).**	60
	- **Neutron TLD cards (^{6}LiF:Mg:Ti)**	100
	- **Extremities TLDs.**	100
	- **Environmental TLD cards (CaSO4:Dy).**	

Mechanical Design and Technology Center
Casting Technology Unit

No.	Description of Equipment	Quantity
1-	**- Portable Hardness Tester** Brinell Hardness Ball Diameter 1, 2.5, 5, 10 mm Standard samples.	1
2-	**- Induction Furnace** Two crucible, changeable 1600°C Capacity 300 Kg for each Melt ferrous & Non Ferrous	1
3-	**- Mobile Sand testing Laboratory for foundry industry:** - Sieve analysis - Permeability - Strength - Moisture content …etc.	1
4-	- Standardization and calibration kit for sand test specimens	1
5-	- Horizontal Band saw - Blade 14" - Vice 90° + 45°	1

Environmental Research Center

No.	Description	Qty.
1.	Multi stage Cyanide distillation system Simultaneous distillation of six samples of water, wastewater or solidwaste	1
2.	Ion chromatograph	1
3.	Purge & Trap concentrator	1
4.	Precision Integrated sound level meter/ noise dosimeter.	1
	This meter shall be used to monitor working area and environmental noise levels.	
5.	Environmental cabinet assembly (environmental chamber) for testing resistance to growth of mold on the surface of interior coatings	1
6.	Gas Chromatograph/ Electron Capture Detector (GC/ECD)	1
7.	Rotary Evaporator System. Evaporation and distillation of organic solvent dissolved samples.	1
8.	Total Kjeldahl Nitrogen Digester.	1
9.	Different equipments to establish a new soil analysis laboratory including:	1
	- Soil Mill accompanied with	
	i- 2mm Sieve sheet. ii- Replacement brush strips. iii- Dust collection system. ♦ Shaker. ♦ Analytical Balance (2) ♦ Oven ♦ Ultrasonic batch cleaner ♦ Fume hood	
10.	Occupational Air Quality Portable Analyzer This portable analyzer shall be used to measure levels of around one-hundred gases in work environments.	1
11.	Occupational Volatile Organic Compounds (VOC's) Portable Analyzer This portable analyzer shall be used to measure levels of VOC's in work environment of industrial processes using volatile organic compounds such as those using organic solvents.	1
12.	Provision of up-to-date window operated software This software shall be used for air pollution dispersion modeling.	1
13.	Continuous Fine Dust Monitor This monitor shall be used to continuously monitor levels of suspended particulate matter equal or below 10/2.5 microns (PM 10/2.5) in the ambient air.	1
14.	Dynamic Gas Calibration System This system shall be used to dilute different standard gases to reach low gas concentrations (in ppm or ppb) in order to calibrate ambient air monitoring analyzers and working area gas monitors.	1

15.	Primary Roots Meter Calibrator This calibrator shall be used to calibrate the orifice meter which is a secondary flow calibrator used to calibrate the flowrate of airborne dust samplers	1
16.	18. Total Reflection X-Ray Fluorescence (TXRE) This analyzer shall be used for different environmental analysis such as the determination of types and concentrations of heavy metals in soil, sediments and ambient air. In ambient air, this is done by analyzing the dust collected on filters.	1

Center : **Industrial Chemistry**
Laboratory : **Textile & Paper**

No.	Description	Qty
1	**Nu-Martindale tester** model 403for the determination the resistance of woven and Knitted fabrics to Abrasion and pilling according to 5690, SN 198525, ASTMD 4966, D 4970,DIN 53863, and DIN 53865.	1
2	**Washing Machine** (type A1) with complete washing procedures programmes for the determinations of the dimensional changes of textile fabrics to washing according to ISO 6330/1984.	1
3	**Steaming Cylinder** with steam generator for the determinations of dimensional changes of textiles fabrics to dry cleaning according to ISO 3005.	1
4	**Air Permeability of Paper** according to ISO 3687 type (Gurley).	1
5	**Driven Precision Yarn Reel Instrument** for the determinations of yarn count according to ISO 2060 • Perimeter : 1 meter • No. of Ends : 5 • Yarn tension: 0.5 – 1CN/tex.	1
6	**Motor driven water penetration tester** for the determination of the resistance of textiles fabrics to water penetration according to ISO 811.	1
7	**Reflectometer** with Filter of 457 ± 0.5 nm for the determinations of the brightness of paper according to ISO 2470 and Tappi T 542.	1
8	**Tensile machine** provided with means of indicating or recording both force and extension, with the following specification: -Adjustable guage length and speed rate - Suitable jaws for both fabrics and yarns - Range a) 0-100 load cell with accuracy to the nearest 0.1 N b) 0-5000 load cell with accuracy to the nearest 1 N	1

Center : **Industrial Chemistry**
Laboratory : **Tobacco & Cigarettes Laboratory**

No.	Description	Qty.
1	**Linear Smoking Machine** of "16 or 20" channels equipped with: • Accessories • Vapor Phase Collector • Co. Analyzer • Puff volume Indicator	**1**
2	**Gas Chromatograph** equipped with following:- • Thermal Conductivity Detector • Packed inlet for 1/4 inch, 1/8 inch • Auto sampler • Integrator	**1**
3	**Auto Injector – Auto sampler** for Gas Chromatograph GC – 17A from Shimadzu	**1**

Center : **Industrial Chemistry**
Laboratory : **Organic & Food**

No.	Description	Qty
1	**Gas Chromatography/Mass Spectrometer (GC/MS) & Accessories** Specifications: 1- Bench top 2- High-Resolution GC/MS system for chemical residues identification 3- Full computer Control 4- High ion transmittance 5- Max resolution 5000, Mass range M/2 1 to 1000 amu, variable ionization modes, EI, PCI, NCI 6- Direct insertion probe for pure samples analysis, and chemstation over 100000 compounds	1
2	Gas Chromatography/Flame Ionization (GC/FID) With split injector and different kinds of columns for olive oil analysis.	1
3	High Performance Liquid Chromatography (HPLC) **with differential refractometer detector for olive oil analysis and Fluorescence detector and post-column derivatization for analysis of Aflatoxins.**	1
4	Automatic Kjeldahl Nitrogen Analyzer Analysis times 12-min, continuous capacity. 20 samples/ hour, sample size 500mg for 0.15-15 %. For the automatic determination of Nitrogen or percent protein. The unit is self-contained with automatic dispensing of liquids and rinsing. Request spare parts for 3 years of operation and chemicals needed for 5000 tests.	1
5	Milk Analyzer For the determination of fat content.	1
6	Meat Analyzer For analyzing meat and meat products.	1
7	Polarimeter For the determination of sugars in food and drinks.	1
8	**Karl Fisher Titration Apparatus**	1
9	Amino acid Analyzer For the analysis of various amino acids in food and fodder samples.	1
10	Automatic Melting Point Apparatus	1
11	Moisture Meter For fast screening of food samples.	2
12	Density Meter and Accessories For oils and alcohols.	1

13	Muffle Furnace	1
14	**pH/Ion Meter**	1
15	**CHNO (Carbon-Hydrogen-Nitrogen-Oxygen)** Complete with accessories for determining the molecular formula of organic compounds.	1
16	**Food Lab System** for testing acidity and peroxide number of edible oil samples.	1

Center : **Industrial Chemistry**
Laboratory : **Petrol & Lubricants**

No	Description	Qty
1	Timken Lubricant Test Machine **according to** ASTM D 2509 for Lubricating Greases ASTM D 2782 for Lubricating fluids.	1
2	Dielectric Breakdown Voltage of Insulating Liquids ASTM D 877, ASTM D 1816 Automatic high-voltage insulating oil test Appts With arrange 0-100 Kv.	1
3	**Evaporating Loss of Lubricating Oils (Noack Test)** According to DIN 51581-CECL 40 T 87 - Noack – Digital VD 250 - Electronic vacuum regulator - Set of glass accessories - Set of vacuum accessories.	1
4	**Drop Test Apparatus** for the determination of package performance according to IATA requirements.	1
5	**Determination of Vapor pressure acc. To Reid ASTM D 323 consisting of Reid Vapor Pressure Bomb, Reid Vapor pressure Bomb for pressure above 1.8 bar, Thermostatic bath for Reid Vapor Pressure Bombs.**	1
6	**Determination of Air Release Value, ASTM D 3427**	1
7	**Demulsibility Characteristics ASTM D 1401**	1
8	**Rapid Flash point Tester ASTM D 3243, ASTM D 3278, ASTM D 3828.**	1
9	**Automatic Oxygen Bomb Calorimeter ASTM D 240**	1
10	**Bench top XRF for the determination of sulpher in oils, lead in gasoline, metal additives in lubricants, and wear metals in used oils.**	1

Center: Industrial Chemistry

Laboratory : Paints, Lacquers & Solvents

No.	Description	Qty.
1	**Constant Climate Chamber** Temperature range (0° to $100C^{\circ}$) Humidity 10 to 90 % R.H Capacity 720 liters.	**1**
2	**Cone and Plate Viscometer** Temperature controlled plate (5 to 65 C°) Viscosity range (0-20 poise). According to ASTM D 4287, ISO 2884.	1
3	**Digital Constant Temperature Bath/ circulator & cooler** Temperature range (0-100 C°) Sample Containers including the high form 600mL Beaker specified for viscometer calibration.	1
4	**Drying Time Recorder & Film Applicator** according to (ASTM D 5895).	1
5	**Multifunction Scratching Tool** according to ASTM, DIN, ISO.	1
6	**Superchroma Spectrocolori Meter** according to ASTM, DIN, ISO	1
7	**Low Voltage Holiday Detector** max coating thickness 500 micrometer according to ASTM G 62.	1

Center : **Industrial Chemistry**
Laboratory : **Inorganic Material**

No.	Description	Qty
1	**Atomic absorption Spectrophotometer** 4- 6 motorized and single/multi coded emission lamps. Flame continuous, automatic/manual positioning, safety measures. Wavelength range 180-900 nm , Double beam, universal head (Titanium), D2 back ground correction, continuous Hydride vapor Unit , Mercury Vaporizer Unit ,analysis water and organic solvents ,Nebulizer (HF resistant), power supply (220-240 V). O.S. Windows 1998.QA/QC -	1
2	**XRD – (X-Ray Diffractometer)** X-Ray tube :3KW. Goniometer : 0.002° (2θ), 0.001° (θ) (minimum step angle) O.S. Windows 95/98/2000/NT	1
3	**LA-ICP-MS** (Laser-Inductive couple plasma-mass spectra) Used for analytical elements for full scanning and for low concentrations.	1
4	**XRF- Sequential Spectrometer** - 250μm mapping capabilities, wave length dispersive method ,elements to be determined (Be to U), X-ray tube 4KW with a thin window, dual target, power supply (220-240 V). O.S. Windows 1998, fully controlled. QA/QC. - Stability +/- 0.005%, Continuous-scanning speed: 0.1° to 300°/min., step scanning 0.002° to 1.0°, stopping position repeatability +/- 0.0004° Max. Counting linearity 1000Kcps for SC; 2000 Kcps for PC, protective circuits, vacuum stabilizer, automatic changing filters and crystals	1

Center: Building Research
Laboratories Division

No.	Description	Qty.
1.	50 kN capacity Traxial apparatus, fully computerized according to BS 1377 and ASTM D 2850 standards. Such as "Digital 50" from "ELE International" Model: EL 25-3516/01.	1
2.	Auto Test Compression/Flexural Machine, such as "EL32-4140/01".	1
3.	Guarded Hot Plate apparatus according to ISO 3802 and ASTM C177. Such as "Guarded Hot Plate instrument – GHP456 Series: from "NETZSCH". Model: GHP456/5.	1
4.	Accelerated Weathering Chamber The apparatus operates light and water exposure "Fluorescent UV-Condensation type) for non-metallic materials according to ASTM G53-96, in order to simulate the deterioration caused by sunlight and water as rain or dew.	1
5.	Equipment and accessories to test Sanitary Ware according to JS 1222 (New Jordanian Standards based on the EN relevant standards. i.e flushing test of W.C. pans).	1
6.	Corrosion Rate Measurement, Resistivity, Half Cell Potential, Rapid Mapping, such as "James Instruments - GECOR 8".	1
7.	Corrosion of Steel, such as "El35-2161 and EL35-2161/10, and EL35-2161/11".	1
8.	Non-Destructive Ultrasonic testing device according to BS 1881 part 203 and ASTM C597.Such as "Pulse velocity meter – PUNDIT" from "ELE International" Model: 35-2301/01.	1
9.	Water Permeability of Concrete, such as "EL35-4043".	1
10.	Skid Resistance Tester, such as "Trolley Towed by Car".	1
11.	Cover to Reinforcement and Concrete Resistivity such as "EL35-2020 Microcovermeter, and EL35-2025 Mini-Probe, and EL35-2175 Hand-held Digital Resistivity Array Meter, and EL35-2020 Micro Cover meter".	1
12.	Double Rings "Infiltrometer".	1

ANNEX-3 Japan's Grant Aid

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed (E/N) by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of a Basic Design of the Project
- Estimation of cost of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon the terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

5) Undertakings required to the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following.

① To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,
② To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
③ To secure buildings prior to the procurement in case the installation of the equipment,
④ To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

⑤ To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
⑥ To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

9) Authorization to Pay (A/P)

The government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

Annex-4 Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the project site	(•)	(•)
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		•
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		•

JORDAN "Law on Standards & Metrology"

LAW NO. (22) OF THE YEAR 2000
STANDARDS AND METROLOGY LAW

Article 1:
This law shall be referred to as the "Standards and Metrology Law" of the year 2000 and shall come into effect thirty days after its publication in the Official Gazette.

DEFINITIONS

Article 2:
The following words and terms, whenever mentioned in this Law, shall have the meanings indicated hereunder unless otherwise indicated by context:

The Minister: Minister of Industry and Trade.
The Institution: The Institution for Standards and Metrology.
The Board: The Board of Directors of the Institution.
The Chairman: The Chairman of the Board.
The General Director: The General Director of the Institution.
Standard: Document that provides for common and repeated use, rules, guidelines or characteristics, for a service, or for a product or its related production methods, including the applicable administrative provisions, with which compliance is not mandatory. These may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product or its production method.
Technical Regulation: Document, which lays down the characteristics for a service or for a product, or its related production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product or its production method.
Conformity Assessment Procedures: Any procedure used, directly or indirectly, to determine that relevant requirements in technical regulations or standards are fulfilled. These may include procedures for sampling, testing, examining and inspection; evaluation, verification and assurance of conformity; registration, accreditation and approval.
Metrology: The science of measurement.
Legal Measuring Unit: The unit of the International System used for purposes of measurement (metric system).
Measuring Instrument: Technical device, instrument or apparatus intended to be used to take measurements, alone or in conjunction with supplementary device(s).
Calibration: Set of operations that establish relationship between values indicated by a measuring instrument and the corresponding values realized by reference measurement standards.
Measurement Standard (etalon): A measuring instrument or reference material intended to define a unit and to serve as a comparison with other measuring units.

2. Establish a national system of measurement and supervise its implementation;
3. Calibrate, control and supervise the implementation of measuring instruments;
4. Approve the national measurement standards (etalons) and reference measurement standards necessary for calibrating measuring instruments;
5. Control the quality of precious metals, stones and jewelry according to the legal fineness, and test the precious metals and jewelry and stamp them;
6. Grant conformity certificates, including the Jordanian Quality Mark;
7. Accredit testing and calibration laboratories and certification bodies, based upon international practices;
8. Utilize local facilities of government bodies and scientific institutions in order to enable the Institution to achieve its objectives and carry out its functions and powers;
9. Support and promote studies and research in the fields relevant to standards, metrology, quality management and conformity assessment, and organize training courses relevant to areas of concern to the Institution;
10. Conclude agreements with Arab, foreign, regional and international organizations and bodies regarding the mutual recognition of certificates of conformity, including quality marks, certificates of laboratory accreditation and competence of the bodies granting such certificates;
11. Cooperate and coordinate with, and become a member, where appropriate, of the Arab, foreign, regional and international organizations and bodies active in the fields of standardization, metrology, quality, conformity assessment and accreditation;
12. Accept and adopt, as appropriate, the standards, technical regulations, guides, recommendations or any other documents of other countries and of Arab, regional and international organizations, provided that they are issued in Arabic or English;
13. Disseminate and sell the publications and other printed materials related to the approved standards and technical regulations issued by the Institution as well as by other Arab, regional, and international organizations or by other countries.

b) The Institution is the sole authority in the Kingdom for all matters relating to standards, metrology and the Jordanian Quality Mark, but it may seek the advice and recommendations of other ministries and governmental departments in such fields.

THE INSTITUTION'S ADMINISTRATION

Article 6:

a) The Institution shall be administered by the Board of Directors under the Chairmanship of the Minister and the membership of:

1. The General Director (Vice-Chairman)
2. Representative from the Ministry of Industry and Trade
3. Representative from the Ministry of Health
4. Representative from the Ministry of Public Works and Housing
5. Representative from the Ministry of Energy and Mineral Resources
6. Representative from the Ministry of Water and Irrigation
7. Representative from the Ministry of Agriculture
8. Representative from the Public Institution for Environmental Protection
9. Representative from the Jordan Exports Development and Commercial Centers Corporation
10. Representative from the Royal Scientific Society
11. Representative from the Federation of the Chambers of Commerce, nominated by the Federation's Chairman
12. Representative from the Chambers of Industry, nominated by the Minister
13. The Chairman of the National Society for Consumer Protection
14. The Chairman of the Jordan Society for Quality

b) 1. The members of the Board who are representatives of the authorities mentioned in Paragraph (a) of this Article, should have the required expertise and competence. The members who are mentioned in Subparagraphs (2-10) of Paragraph (a) should be nominated by their respective ministers or directors general or chairmen, as the case may be.

2. The assignment of the members of the Board shall be for two years renewable once, and they may be replaced by others in the same manner of their appointment.

c) Remuneration for the members of the Board shall be determined by the Cabinet upon the recommendation of the Minister.

Article 7:

a) The Board shall convene its meetings at least once every month and whenever necessary upon an invitation from the Chairman or, when absent, by his Vice-Chairman. The meeting shall be considered legally valid if attended by at least nine members, provided that the Chairman or the Vice-Chairman shall be one of them.

b) The Board shall issue its decisions unanimously or by majority vote of its present members. If the votes are tied, then the vote of the meeting's Chairman shall be determinant.

c) The Board shall be entitled to invite qualified experts to the meeting for consultation, without such experts being entitled to vote.

d) The General Director shall appoint one of the Institution's members to perform the duties of the Board's Secretary.

2. Upon studying the proposed drafts submitted by the technical committees, the General Director shall submit the proposed draft with his recommendations to the Board for their adoption as standards or technical regulations.
3. Should the Board reject any of the submitted proposed draft standards, they shall be referred back to the relevant technical committee for further consideration.

b) The standard approved by the Board shall be considered as an approved Jordanian Standard and shall be issued either as a standard or a technical regulation, and shall become effective from the date determined by the Board.

Article 11:

a) Wherever possible and appropriate, the standards and technical regulations shall be based on product requirements in terms of performance rather than design or descriptive characteristics.

b) Technical regulations are approved when they are necessary to fulfill legitimate objectives, such as national security requirements; the prevention of deceptive practices; the protection of human health and safety, animal and plant life and health, or the environment, taking into account the risks that non-existence of such regulations would create. The approved technical regulations or standards shall not be more trade-restrictive than necessary to fulfill the legitimate objectives or the required level of protection.

c) Where relevant international standards exist, they shall be used as a basis for the preparation of standards or technical regulations, except when such international standards would be ineffective or inappropriate for the fulfillment of the legitimate objectives or the required level of protection, or because of climatic or geographical factors, technological problems, or if otherwise dictated by the Kingdom's financial, development, or trade needs.

Article 12:

a) The technical regulations of other countries shall be considered as equivalent to Jordanian technical regulations, if it is evident that such regulations adequately fulfill the objectives of the Jordanian technical regulations.

b) Standards and technical regulations are reviewed periodically or upon the request of any interested party. Technical regulations shall be suspended if the circumstances or objectives giving rise to their approval no longer exist or if the changed circumstances can be addressed in a less trade-restrictive manner.

Article 13:

In addition to what is stated in this Law, the Institution shall apply the "Code of Good Practice for the Preparation, Adoption and Application of Standards", which shall be issued in accordance with instructions set out by the Board for this purpose.

CONFORMITY ASSESSMENT WITH STANDARDS AND TECHNICAL REGULATIONS

Article 14:

a) Where relevant international guides or recommendations exist, they shall be used as a basis for the preparation of conformity assessment procedures, except when such international guides or recommendations are deemed to be ineffective or inappropriate to fulfill certain purposes such as national security requirements; the prevention of deceptive practices; the protection of human health and safety, animal or plant life and health, or the environment, or because of climatic or geographical factors, technological problems or if otherwise dictated by the Kingdom's financial, development, or trade needs, taking into account the risks that non-existence of such procedures would create. The adopted conformity assessment procedures shall not be more trade-restrictive than necessary to fulfill the required purposes.

b) All conformity assessment procedures are applied on local products and like imported products without unjustified discrimination.

c) The results of conformity assessment procedures carried out in other countries shall be considered as equivalent to the conformity assessment procedures applied in the Kingdom, if the Institution is satisfied that such procedures offer an assurance of conformity with applicable standards or technical regulations.

Article 15:

a) Conformity assessment procedures shall be issued in accordance with instructions issued by the Institution or any relevant official body, in which they determine the information required for performing conformity assessment procedures, which shall be limited to what is necessary to assess conformity, the fees imposed, and the method of dealing with submitted complaints that might arise with respect to the application of conformity assessment procedures.

b) Whenever the product specifications or production method are changed subsequent to the determination of its conformity to the applicable standard or technical regulation, the conformity assessment procedure for the modified product or process shall be limited to what is necessary to determine whether adequate confidence exists that the product or process still meets the requirements of the technical regulation or standard concerned, whenever practical.

c) All information relating to the conformity assessment procedures are confidential.

Article 16:

a) All technical regulations shall be applied to local products and like imported products without unjustified discrimination. No product or material shall be imported into the Kingdom, produced, sold, displayed or circulated in any form in the Kingdom, unless it complies with the technical regulations for that product or material.

b) In especial cases and subject to valid reasons, the Board shall be entitled to exempt any product from the provisions of this Article.

c) Upon a written authorization by the General Director, any employee of the

Institution may inspect and search any factory, shop, facility, warehouse, or market, and take samples of the products, material, measuring units or industrial waste therein or of products produced or manufactured therein, or of by products thereof, in order to test, examine, analyze and calibrate them for purpose of verifying their compliance with the technical regulations.

Article 17:

a) The Ministries, government departments, public corporations, municipal and rural boards shall comply with the technical regulations in carrying out their activities, projects, tender terms, and purchases of products and materials.

b) Industrial companies and institutions shall be responsible for compliance with the technical regulations for the products they produce and the materials used therein and the production methods.

c) All industrial and commercial institutions and companies shall comply fully with the approved technical regulations related to the protection of the environment, health and vocational safety.

Article 18:

The security forces and any other relevant authorities shall upon request assist the Institution's employees who are authorized by the General Director in performing their duties. The Institution shall also provide its support to other official departments and bodies to fulfill the purposes of this Law.

Article 19:

a) The Board shall issue instructions specifying the basis for accrediting, evaluating and monitoring testing and calibration laboratories and certification bodies in accordance with international practices, and the determination of the remuneration of evaluators of such laboratories and the experts in the technical accreditation committees.

b) The competence of bodies in other countries that grant accreditation shall be recognized pursuant to mutual recognition agreements.

Article 20:

a) The Institution shall grant the Jordanian quality mark and certificates of conformity with standards and technical regulations pursuant to the results of conformity assessment procedures, in accordance with instructions issued by the Board which determine the basis for granting the quality mark and certificates of conformity and the fees applicable thereto.

b) The Institution's task of granting certificates of conformity may be delegated to any body within or outside the Kingdom, recognized by the Institution according to international practices.

c) Recognition agreements for the competence of bodies that issue certificates of conformity in other countries may be concluded.

d) Certificates of conformity issued by certification bodies, which are accredited by an accreditation body recognized by the Institution, according to international practices may be accepted.

Article 21:
Procedures shall be set to control the quality of precious metals, stones and jewelry according to the legal fineness, and to test the precious metals and jewelry and stamp them, in accordance with instructions issued by the Board for this purpose.

Article 22:
No measurement units shall be used except those units approved by the Kingdom.

ANNOUNCING STANDARDS, TECHNICAL REGULATIONS AND CONFORMITY ASSESSMENT PROCEDURES

Article 23:

a) When international standards, guidelines or recommendations do not exist or the technical content of a proposed technical regulation or conformity procedure is not in accordance with the technical content of the relevant international standards, guidelines or recommendations, and if the proposed technical regulation or the conformity assessment procedure may have a significant effect on trade, the Institution and any other relevant official body shall:
   1. Publish a notice in its newsletter at an early stage of preparation of the proposed new technical regulation or conformity assessment procedure.
   2. Notify the World Trade Organization (WTO) through the national competent authority at an early stage of the products to be covered by the proposed new or amended technical regulations or conformity assessment procedures, together with a brief summary of their objectives and rationale. A reasonable time shall be allowed for written comments from the WTO's Members thereupon, and such comments shall be taken into account without discrimination and shall be incorporated, where appropriate, into the finalized version of the technical regulations or conformity assessment procedures.
   3. Upon request thereof, any interested parties shall be allowed to become acquainted with the proposed technical regulations or conformity assessment procedures.

b) The conformity assessment procedures instructions, and the numbers and titles of the standards and technical regulations, the prices for obtaining such, and the effective date thereof shall be published in the Official Gazette, provided that the approved instructions, standards and technical regulations enter into force in not less than three months from the publication date.

c) Notwithstanding what is stated in this Article, where urgent problems of national security, safety, health, or environmental protection arise, technical regulations or conformity assessment procedures may be approved and applied immediately, provided that:
   1. The WTO is notified immediately of that and of the products to be covered by these technical regulations or conformity assessment procedures, together with a brief summary of their objectives and

rationale, provided that the written comments received from the WTO Members shall be taken into account

2. Publish the titles of the technical regulations and the conformity assessment procedures' instructions in the Official Gazette.
3. Upon request thereof, any interested parties shall be allowed to become acquainted with the approved technical regulation or conformity assessment procedures.

Article 24:

a) Notwithstanding what was stated in any other legislation, all official bodies when preparing, approving and applying technical regulations or conformity assessment procedures pursuant to their respective legislation shall comply with the provisions of this Law with regards to technical regulations or conformity assessment procedures, taking into account that the provisions of Articles (10) and (21) of this Law shall apply exclusively on the Institution.

b) 1. The Institution and all official bodies shall coordinate when preparing and issuing technical regulations or conformity assessment procedures to avoid any inconsistency with any existing technical regulations or conformity assessment procedures.

2. These technical regulations shall become effective from the date determined by any of these official bodies.

Article 25:

The Institution shall, through its inquiry point, undertake the following:

a) 1. To answer any inquiry from any relevant body within and outside the Kingdom concerning the proposed or approved standards, technical regulations, metrology and conformity assessment procedures in the Kingdom;

2. To provide any of the relevant bodies with information concerning the membership and participation of the Institution or any official body in Arab, regional and international institutions and bodies that operate in the fields of standardization, metrology, technical regulations, quality, conformity assessment and accreditation, and any mutual recognition agreements signed with these institutions and bodies.
3. Where copies of available documents concerning any of the matters mentioned in Subparagraphs (1 and 2) of this Paragraph are requested, these shall be supplied, where possible, at a price which reflects the cost of the supplied documents as determined in accordance with the instructions issued by the Board for that purpose.
4. All procedures provided for in Subparagraphs (1, 2 and 3) of this Paragraph shall be completed no longer than forty-five days of the inquiries' submission.

b) All official bodies shall, in no longer than ten days of being so requested, provide the Institution with all the necessary information concerning the technical regulations and conformity assessment procedures and copies of such, to enable the Institution to take the necessary procedures within the period set out in Subparagraph (4) of Paragraph (a) of this Article.

THE INSTITUTION'S BUDGET AND REVENUES

Article 26:

a) The Institution shall have an independent budget, to be administered in accordance with the regulations in force.

b) The Institution shall follow in regulating its accounts and books the rules and principles of commercial accounting.

c) The Institution shall be responsible for preparing a report of its activities at the end of each fiscal year to be submitted to the Cabinet, along with its general budget. These should be submitted before the end of March of every year.

d) The budget shall be audited annually by the Auditing Bureau, and the Institution may appoint an auditor for it.

Article 27:

a) The fees for services, testing, analysis, calibration, stamping carried out on products, materials, and measuring instruments produced and manufactured in the Kingdom, imported to or exported from the Kingdom, shall be determined in accordance with instructions issued by the Board, and shall be paid by the parties requesting such testing, analysis and calibration services.

b) The fees for granting the quality mark, certificates of conformity and accreditation for laboratories shall be determined in accordance with instructions issued by the Board, and shall be paid by the parties to which such conformity assessment activities are carried out in order to grant them the quality mark, the certificate of conformity, or accreditation.

c) The fees and prices charged for the services provided by the Institution shall reflect solely the cost of such services.

d) Notwithstanding what is stated in any other legislation, no Ministry, government department, public corporation, natural person, or corporate entity shall be exempt from paying the fees and financial charges and duties imposed for the activities and services that the Institution performs, pursuant to this Law or any of the related regulations, or instructions issued by the Board.

Article 28:

The revenues of the Institution comprise of:

a) Fees, services and costs paid for the services provided by the Institution;

b) Allocations in the general budget;

c) Loans, grants, donations, and assistance provided to the Institution and approved by the Board;

d) Any other revenues approved by the Board.

Article 29:

a) The Institution shall entertain all exemptions and facilities provided for all other ministries and public departments.

b) The funds of the Institution shall be considered as public property, and shall be collected pursuant to the collection of Public Property Law in force.

PROCEDURES AND SANCTIONS

Article 30:

a) The Institution shall send a written notice to the producer or owner of any product found not to be in conformity with a technical regulation, requiring compliance of the product within a period specified by the Institution.

b) If the producer or the owner of the product or material referred to in Paragraph (a) of this Article does not comply with the technical regulation issued by the Institution within the specified period, the Chairman, upon the recommendation of the General Director, shall order the closure of the shop, factory, warehouse, or facility containing the product or material until the violation is corrected.

c) If the product or material is found not to be in compliance with the applicable technical regulation issued by the Institution, the General Director shall issue a written order to seize, dispose of, or re-export the product, or alter its manufacture in such a way as to bring it into compliance with the technical regulation.

d) The Chairman shall be authorized, upon the General Director's recommendation, to order the closure of any factory not in compliance with the environmental technical regulation issued by the Public Institution for Environmental Protection until the violation is corrected.

e) Any illegal measuring instrument found in any shop, factory, warehouse or facility shall be seized.

Article 31:

a) Without prejudice to any severer penalty stipulated in any other Law, any person or firm who commits any of the following shall be liable for a fine of not less than five hundred Dinar and not more than five thousand or imprisonment for at least four months but not more than six months, or for both punishments. For recurrent violations the punishment shall be the maximum of both punishments:

1. The illegal manufacturing or sale of measuring instruments, or manipulation of legal measuring instruments;
2. The use of any measuring instruments which are not sealed or stamped by the Institution or which are otherwise illegal;
3. Not allowing any officer authorized pursuant to this Law to seize illegal measuring instruments whether they belong to the violator or to others;
4. Not allowing any officer authorized pursuant to this Law to enter into any factory, shop, warehouse, or any other facility for the inspection, search, testing or analysis of any product, material, or measuring instrument produced, used, displayed for sale, stored, or maintained in that factory, warehouse, or facility;
5. Manipulation of the stamps, seals, marks, reports, or certificates used by the Institution, or issued by it;
6. Forging the measurements and sizes of products or materials;
7. Offering or displaying products not in compliance with the technical regulations in the markets or shopping areas;

8. Manipulating data on the product label and forging or fabricating forged labels and cans;
9. Writing any information indicating the compliance with Jordanian Standards or technical regulations on the product label without a written approval from the Institution or other relevant official body;
10. Deceiving or cheating the consumer through misleading advertisement of the products or materials produced, imported, or sold, and mixing fuel and any such activities.

b) Any person forging a stamp, seal, mark, certificate, fabricating a seal used by the Institution for the purpose of carrying out its duties under the Law, or using a forged stamp, mark or certificate shall be subject to the punishment for forgery pursuant to the Penal Code.

c) Any person violating the provisions of Paragraph (a) of Article (16) and Articles (17) and (22) of this Law shall be liable to a fine not less than a hundred Dinar and not more than a thousand.

d) The Institution shall be entitled to publish the names of the convicted persons in the media.

CONCLUDING PROVISIONS

Article 32:
The Cabinet shall issue the regulations required for implementing the provisions of this Law, including the regulations related to the Institution's financial, supplies and personnel's affairs.

Article 33:
All instructions referred to in this Law shall be published in the Official Gazette and shall come into force 30 days after their publication.

Article 34:
The Standards and Metrology Law No. 15 for the Year 1994 is cancelled. All regulations, instructions and decisions issued pursuant to that Law will remain in effect as long as they
do not contradict the provisions of this Law, until they are either cancelled or replaced by others in accordance with its provisions.

Article 35:
The Prime Minister and the other Ministers in the Kingdom shall be responsible for the implementation of the provisions set out in this Law.

ヨルダン国の校正サービス

(JISM Web サイト“What is Calibration”抜書)

Calibration services in Jordan

1- Jordan institution for standards and Metrology (JISM)
2- Royal Scientific Society (RSS)
3- Royal Jordanian Air Force (RJAF)

1- Jordan institution for standards and Metrology (JISM)

1.1 Mass calibration

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
1. Mass	1 mg 20 kg	E2	- Mass for accuracy class F1 and less - Any weighing instrument - Weighing bridges up to 20 tons.
2. Non-automatic weighing instrument	Up to 1500 kg weighing ranges and accuracy classes II, III, and IIII	Sets of weights of different classes (E2, F1, F2, M1).	
3. Weighing bridges	1 ton 20 tons	Mass of 500 kg, class F	

1.2 Length measures:

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Length measures Tape measure Steel meter	Upto 20 m 0 100 cm	Grade II ± 17 μm	- Measuring - Steel rulers tapes

2-Royal Scientific Society (RSS)

2.1 DC voltage/current

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Voltage measurement	10 mV 1000 V	± 5 ppm 20 ppm	- Analog & digital multimeters - DC meters - Power supplies & dividers - Current shunts - Meggers & clamp-on meters - Resistance & decades
Current measurement	1 mA 2000 A	± 30 ppm 120 ppm	
Voltage generation	1 mV 1000 V	± 0.00007% 0.00065 %	
Current generation	20 μA – 20 A	± 0.001% 0.0016 %	
Resistance measurement	0 Ω –100 MΩ	± 25 ppm 535 ppm	
Resistance generation	0 Ω - 100 MΩ	± 0.0016% 0.019 %	

2.2 AC voltage/current (40 Hz to 500 Hz)

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Voltage measurement	10 mV 1000 V	± 100 ppm 300 ppm	- Analog & digital multimeters - AC meters - AC supplies - AC transformers
Current measurement	1 μA –20 A	± 260 ppm 1205 ppm	
Voltage generation	1 mV –1000 V	± 0.0019% 0.013%	
Current generation	20 μA–20 A	± 0.001% 0.066 %	

2.3 RF Frequency and time

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Frequency measurement	10 Hz 18 GHz	± (2+1000)x10^{-9} MHz	- Frequency and time instrument - Frequency generators - Frequency counters - Oscilloscopes - Function generators - Sweep oscillators
Frequency generation	1 Hz 18 GHz	± (2+1000)x10^{-9} MHz	
Time instant measurement	Hour, minute, second	± 2 ms	
Time instant generation	Hour, minute, second	± 1x10^{-12}	
Time interval measurement	10 μs - 1 s	± 0.1%	
Time interval generation	1 s interval	± 14 ns	

2.4 RF Attenuation

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Calibration of primary standards	0 dB 50 dB Frequency 30 MHz	± 0.03 dB	- Level and attenuation calibrators - Transmission measuring instruments - Resistance attenuators - Attenuators & step attenuators - Impedance transformers - Signal generators
Calibration of attenuators	0 dB 100 dB Frequency 10 Hz 12.4 GHz	± 1.8 dB	

2.5 RF voltage

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Voltage generation	1 mV 5 V Frequency 1 MHz	± 0.055 %	- RF Millivoltmeters - True RMS voltmeters - Selective level meters - Electronic RF voltmeters
Voltage measurement and generation	3 mV 3 V Frequency 1 kHz 1 GHz	± 1 % - ± 10 %	
Voltage measurement	(-90 20) dBm Frequency 300 kHz 1 GHz	± 1 dB	

2.6 RF power

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Low-level power measurement & generation	10 μW 10 mW Frequency 20 MHz 18 GHz	± 0.04 dB or ± 1%	- Power meters - Power sensors - High power fixed attenuators - Coaxial attenuators - RF Oscillators - Power amplifiers - Power signal source - Directional coupler - Microwave amplifiers
Medium-level power measurement & generation	10 mW 50 W Frequency 500 kHz 1 GHz	± 3% of Full scale	
High-level power measurement & generation	1 W 150 W Frequency 10 kHz 520 MHz	± 3% of Full scale	

2.7 Temperature

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Temperature measurement	-40 °C - 1200 °C	± 0.01 € 1 C	- Furnaces - Drying ovens - Incubators - Water baths - Freezers - Refrigerators - Temperature and humidity chart recorders - Liquid in glass thermometers - Thermocouples - Resistance thermometers - Electronic and mechanical thermometers
Relative humidity	(10 - 100) RH%	± 0.8 %	

2.8 Pressure

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Low-pressure	-1 20 bar	0.025 % ± 1 digit	- Barometers - Manometers - Pressure gauges - Pressure transducers
Medium-pressure	20 700 bar	0.08 % ± 1 digit	

2.9 Dimensions

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Length Gauge blocks sets	1 mm 1 m	± 0.05 m 0.3 m	- Vernier calipers - Micrometers - Linear scales and line standards - Mechanical and electronic dials

2.10 Mass

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Mass E2 class F1 class	1 mg 10 kg 1 mg 10 kg	E2 class F1 class	- Laboratory balances of varying different capacities and resolutions

2.11 Force

Function	Calibration range	Accuracy class of the standard	Instruments to be calibrated
Force Compression and tension Compression	500 kN 100 kN	± 0.005 % ± 0.01%	- Load cells - Universal testing machines

3- Royal Jordanian Air Force (RJAF)

3.1 DC Voltage and low frequencies

Function	Calibration range	Accuracy Class of the standard	Instruments to be calibrated
DC Voltage	0.0 - 1100kV	(9 ppm of O/P* +0.0008 mV) to (11 ppm of O/P+0.6mV)	– Multimeters – Oscilloscopes – Signal generators – Frequency counters – Power supplies – DMM – RLC meters
	1 - 10 kV	0.025 % of Reading	
DC Current	0-11A	(60 ppm of O/P+10 nA) to (360 ppm of O/P+0.480 mA)	
	11-20A	0.025% of O/P+1 mA	
AC Voltage	1mV-220V 10 Hz-1 MHz	(85 ppm of O/P +0.007 mV) to (1.3% of O/P+220 mV)	
	220 V-1100 V 50 Hz-100 kHz	(90 ppm of O/P+4 mV) to (0.23% of O/P +45 mV)	
AC Current	0.220 mA-11 A 10 Hz-10 kHz	(160 ppm of O/P +20 nA) to (1% of O/P + 0.200 mA)	
	11 A-20 A 30 Hz-5 kHz	0.05 % of O/P x Frequency in kHz + 1mA	
Resistance	0.0-330 MΩ	(0.009% of Setting + 0.015 Ω) to (0.5 % of Setting + 16.5 kΩ)	
Capacitance	0.33 nF to 1.1 mF 50 Hz –1 kHz	(0.5% of setting+0.01 nF) to (1% of setting+30 nF)	
Inductance	0-10 mH	2% Per Step	
	0-100 mH	1% Per Step	
	0-10 H	0.75% Per Step	

* O/P: output

~~••••••~~•A higher accuracy for voltage, current and resistance can be obtained to calibrate working standards .

3.2 High Frequency Microwave Lab

Function	Calibration range	Accuracy Class of the standard	Instruments to be calibrated
Attenuation	(-127 dB) - (+30 dB)	(0.2 dB + 0.2 dB /10 dB Step +Last Digit + Noise Error) Noise Error :<0.18 dB Fo Levels <- 110 dB	– Microwave Signal Generators – Spectrum analyzers – Power Meters. – Attenuators. – Amplifiers. – Modulation Analyzers. – Wattmeters. – Frequency Counters. – Navigation Equipments.
Rf Power	1 mW – 100 W (continuous wav Power)	0.15 dB (continuous wave) of Reading.	
	1 W – 10 kW (Pea Power)	0.3 dB (Peak) of Reading	
Frequency	10 MHz - 26.5 GHz	Time Base Stability x Frequency (Time Base Stability $5x10^{-10}$ /Day Hz or $1x10^{-7}$/Year Hz)	
Time	1 pps* and 1 ppm**	140 ns of universal time coordination.	

*pps : pulse per second

**ppm:part per million

3.3 Electro-optics

Function	Calibration range	Accuracy Class of the standard	Instruments to be calibrated
Length	0 - 100 Inch As Gage Blocks 0 – 2540 mm	Accuracy of (6ì in) can be obtained 0.1524 ìm	– Micrometers – Calipers – Dial Indicators – Depth Gages – Height Gages – Gage Blocks – Theodolites – Clinometers – Protractors – Sine Bars – Parallel Bars – Surface Plates – Levels – Collimators – Right Angles – Flat Mirrors
	0 - 48 inch As Measurement 0 – 1219 mm	6 ì in.- 200 ìin. 0.1524 ìm – 5.08 ìm	
Angle	1′- 99□ As Angle Generation	0.8 " - 15 "	
	1 "- 360□ As Measurement	2.5 "- 1 ′	
Flateness	0 - 0.02 inch 0 – 0.508 mm	6ì inch - 200ì inch 0.1524 ìm – 5.08 ìm	
Light	0 - 2000 Foot. Lamberts 0 – 21527 m.cd	3.6 % Of Indication	

3.4 Physical Standards and Dimentions

Function	Calibration range	Accuracy Class of the standard	Instruments to be calibrated
Air Pressure	0.2 - 12140 psi 140 – 853265 kg/m²	0.0035 - 0.05% of Indication	Test Equipment Related To One Of The Functions Listed In The First Column Such As: – Pressure Gauges. – Thermometers. – Temperature Baths. – Load Cells. – Flow Meter. – Vibration Pick Up. – Hygrometers – Torque Wrench – Torque Multipliers – Tensiometers – Weights – Balances
Oil Pressure	6 - 12140 psi 4218 – 853265 kg/m²	0.05 % of Indication	
Thermocouple	-190 - 1200 °C	0.01% of Indication	
Force (Compression)	0 - 100000 LB 54360 kg	0.05% of Indication	
Force(Tension)	0 - 60000 LB 27000 kg	0.05% of Indication	
Fuel Flow	0.2 - 310 GPM (0.75 – 1173) Lpm	0.5% of Indication	
Air Flow	1CCM-979 LPM (0.001 – 979) Lpm	0.3% of Indication	
Humidity	0 - 100% RH	3% RH of Indication	
Torque	0.5 in oz - 2000 ft.lb (0.027 – 2976) kg/m	0.25% of Indication	
Tension	5 - 2000 LB (2.3 – 907) kg	5% of Indication	
Weight*	1/64 –10 OZ 0.44 g – 283 g	CLASS S	
	1 mg - 1 kg		
	0.001-25 LB 0.45 g – 4.5 kg		

* Weight sets are classified in accordance to the American Society For Testing And Materials (ASTM) E617 specification.

要請ラボの概要(1/3)

センター名	ユニット名　またはラボ名	連絡先 (E-Mail ｱﾄﾞﾚｽ)	創設年	構成員	ラボ認定	活動分野	活動内容	外部よりのニーズ・期待事項	将来計画
MDTC	材料強度 Unit	内線 733 khraishi@rss.gov.jo	1970	統括 2 学卒技術者 1 技術者 1 合計 4	UKAS	金属製品	・棒鋼、鋼管、板金、金網、ﾜｲﾔなど鋼材に関する抗張力、曲げ、抗圧、衝撃等の試験（2002 年度試験業務数：5000） ・国家標準作りへの参画（2002 年度標準作成：3 件）	主な業提携先：各種官公庁、ｱｶﾊﾞ経済特区、JISM、パレスチナ標準局、各種私企業	・品質検査業務から監督業務への拡大 ・機材/ｽﾀｯﾌ能力の向上 ・ﾈｯﾄﾜｰｸ(ｲﾝﾄﾗﾈｯﾄ)の構築
	プラスチック/ゴム Unit	内線 733 khraishi@rss.gov.jo		統括 2 学卒技術者 3 技術者 1 合計 6	DAP(独) JISM	プラスチック ゴム製品	・プラスチック/ゴム製品サンプル分析 ・プラスチックパイプに関する現場指導 ・国家標準作りへの参画 ・学生や税関職員に対する訓練指導 ・灌漑システムの開発研究 ・プロジェクト評価 （過去 3 年間の研究発表：8 件）	・プラスチック/ゴムに関するヨルダン国内唯一のラボ。 ・国内ばかりでなくイエメンやパレスチナなどの近隣諸国にもサービスを実施している。 主な業提携先：各種官公庁、ｱｶﾊﾞ経済特区、JISM、パレスチナ標準局、各種私企業	・ｿﾌﾄﾄﾞﾘﾝｸ、自動車ﾀｲﾔ、ﾊﾟｲﾌﾟﾌｨｯﾃｨﾝｸﾞ等の新業務 ・品質ｲﾝﾌﾗの再構築、適合性審査などのコンサルティング業務 ・R/D ﾌﾟﾛｼﾞｪｸﾄの支援 ・ﾈｯﾄﾜｰｸ(ｲﾝﾄﾗﾈｯﾄ)の構築
	金属組織・熱処理 Unit	azzam@rss.gov.jo		統括 2 学卒技術者 1 技術者 1 合計 4	UKAS JAS	鉄、鉄鋼 非鉄金属	・金属材料試験分析（ 2002 年度試験業務数：600 ｻﾝﾌﾟﾙ） ・破損/さび調査分析 ・金属製品開発改良コンサルティング ・熱処理技術 ・国家標準作りへの参画（2002 年度標準作成：3 件）（過去 3 年間の研究発表：14 件）	・ヨルダンで最初の UKAS 認定受領ﾗﾎﾞ ・公共事業省認定第 3 者検査機関 ・国内ばかりでなくイエメンやパレスチナなどの近隣諸国にもサービス実施 主な業提携先：各種官公庁、ｱｶﾊﾞ経済特区、JISM、パレスチナ標準局、各種私企業	・現場指導業務の拡大 ・IT 対応 ・機材のアップグレード ・R/D ﾌﾟﾛｼﾞｪｸﾄの支援
	鋳造技術 Unit	hmeidan@rss.gov.jo	1988	統括 1 学卒技術者 2 技術者 2 合計 5	なし		・ﾀﾞｸﾀｲﾙ鋳鉄技術の研究 ・ｼﾘｶ砂の分級 ・原料用ｽｸﾗｯﾌﾟ材の分級 ・鋳造業者用データベースの確立 ・ﾘﾝ化灰色鋳鉄による機関車のﾌﾞﾚｰｷｼｭｰ製作 （過去 3 年間の研究発表：3 件）	・現場ｻｲﾄﾞに於ける鋳造技術指導 ・鋳物砂、原材料、溶融などの技術指導 ・製品鋳造物の検査分析	・関係業者間との密接な関係作り
	非破壊検査 Unit	内線 717 Mmosa@rss.gov.jo		統括 2 学卒技術者 1 技術者 1 合計 4	なし	鉄、鉄鋼 建材	・非破壊検査（2002 年度業務数：150） ・品質管理（2002 年度業務数：2） ・(過去 3 年間の研究発表：4 件）	・非破壊検査の 2 級、3 級取得者によるﾄﾚｰﾆﾝｸﾞ ・公共事業省認定の第 3 者検定機関	石油精製、石油化学、発電、航空、鉄鋼構造物、圧力容器などの分野。
	放射線測定/校正 Lab.	内線 374 GANNASPECT@NETSCAPE.NET	1985	統括 1 学卒技術者 1 技術者 1 合計 3	UKAS	食品工業 環境	・輸出入品の食品、飼料、飼料添加物、農薬、洗剤などに対する放射能測定 ・作業所や環境に対する放射能汚染調査 （2002 年度試験実績：800 件） （過去 3 年間の研究発表：外部に 3 件）		・α/β線放射線測定を含む業務拡大 ・放射化学ﾕﾆｯﾄの創設 ・ﾗﾄﾞﾝｶﾞｽ測定法の紹介
	個別線量測定 Lab.	内線 727 mmosa@rss.gov.jo		統括 1 学卒技術者 1 技術者 0 合計 2	なし	放射線	・放射能関係者へのサービス業務 ・放射能保護(ﾚﾍﾞﾙ 1)訓練から国家ﾚﾍﾞﾙまでの放射能に関するﾄﾚｰﾆﾝｸﾞ ・（2002 年度被験者実績：2000 名）（過去 3 年間の研究発表：ｱﾒﾘｶの研究誌に 3 件）		・放射能関連作業者への線量測定サービス拡大 ・機材及び要員のアップグレード

要請ラボの概要(2/3)

センター名	ユニット名 または ラボ名	連絡先 (E-Mail ｱﾄﾞﾚｽ)	創設年	構成員	ラボ認定	活動分野	活動内容	外部よりのニーズ・期待事項	将来計画
ICC	繊維・紙 Unit	内線 689 kmajali@rss.gov.jo	1975	統括 3 学卒技術者 1 技術者 2 合計 6	UKAS JISM	繊維 紙	(2002 年度試験実績：674 件) (過去 3 年間の研究発表：なし)		・ 認定の保持と全試験分析項目に対する認定取得。 ・ ｽﾀｯﾌの教育訓練 ・ 繊維及び紙の分野で国際ラボコンペに参加する。
	煙草 Unit	内線 699 kmajali@rss.gov.jo	1998	統括 3 学卒技術者 1 技術者 2 合計 5	UKAS JISM	煙草	(2002 年度試験実績：208 件) (過去 3 年間の研究発表：なし)		・ 地域密着型業務の展開 ・ 世界中の 50 ヶ国以上が参加する ACS での共同研究参加。 ・ ｽﾀｯﾌの教育訓練
	無機物 Div.	adisaid@rss.gov.jo	1970	統括 1 学卒技術者 7 技術者 2 合計 10	DAP(独) JISM	有機を含む原料 製品類	(2002 年度試験実績：12,880 件) (過去 3 年間の研究発表：2 件)	工業部門：化学洗剤､肥料、 原材料 近隣国：ｻｳﾃﾞｨｱﾗﾋﾞｱ、ﾘﾋﾞﾔ、ｴｼﾞﾌﾟﾄなどからの石鹸洗剤類	計画業務：XRD 分析の開始､洗剤添加物・重金属などの分析
	応用技術 Div.	内線 511 rida@rss.gov.jo	1978	統括 1 学卒技術者 7 技術者 3 合計 11	JAS	塗料 ラッカー 溶剤 建材ほか	石油製品および塗料全製品に関する科学及び物性分析（2002 年度実績：3,492 件）		・分析分野の拡大 ・ｽﾀｯﾌと機材のｱｯﾌﾟｸﾞﾚｰﾄﾞ
	ｸﾛﾏﾄｸﾞﾗﾌ Unit	内線 421 sharif@rss.gov.jo	1991	統括 1 学卒技術者 3 技術者 1 合計 5	なし	有機原料/製品類	(2002 年度試験実績：2000 件) (過去 3 年間の研究発表：14 件)	・国内及び近隣諸国よりの国際規則に則った科学的判断を与える唯一の機関 ・高水準の教育ﾄﾚｰﾆﾝｸﾞ	・計測方法のｱｯﾌﾟｸﾞﾚｰﾄﾞ ・計測品目と数量の増大 ・機材のｱｯﾌﾟｸﾞﾚｰﾄﾞ ・国際ﾗﾎﾞ認定の取得
	有機/食品 Unit	内線 663 bourghli@rss.gov.jo	1970	統括 1 学卒技術者 10 技術者 2 合計 13	UKAS JAS	食品/飼料	(2002 年度試験実績：15,040 件) (過去 3 年間の研究発表：8 件)	・ 食品､飼料､化学ｻﾝﾌﾟﾙ ・ 顧客：食品工業者､飼料工業者、 農場、 JISM、保健省､農業省	・ 分析範囲の拡大 ・ 特にオリーブオイル及び食品添加物の分野
ERC	化学分析ﾗﾎﾞ	内線 422 eddadu@rss.gov.jo	1976	統括 1 学卒技術者 4 技術者 3 合計 8	JISM	環境	(20002 年度計測ｻｰﾋﾞｽ実績：18000 件) (過去 3 年間の研究発表：12 件)	・上水と排水分析に関するジョルダン国の基準ラボ ・高水準の教育ﾄﾚｰﾆﾝｸﾞ	・土壌の化学的及び物理的分析が必要となり調整室の創設が必要である。 ー農業技術者による土壌分析 ークラッシャ､シェーカー､ｵｰﾌﾞﾝなどの土壌ｻﾝﾌﾟﾙ準備用機器 ・上水と排水分析活動を分離する。
	大気品質ﾗﾎﾞ	内線 350, 571 rafat@rss.gov.jo	1983	統括 1 学卒技術者 3 技術者 3 合計 7	なし	全部門	(20002 年度計測ｻｰﾋﾞｽ実績：48 件)	・ 大気品質測定に於いてあらゆる項目を網羅するように期待されている。 ・ 核汚染についても調査出来るようにすること。	・ｽﾀｯﾌ増員と教育訓練 ・機材のｱｯﾌﾟｸﾞﾚｰﾄﾞと必要機材の充当 ・学術調査研究の実施
	ﾏｲｸﾛﾊﾞｲｵﾛｼﾞｰ ﾗﾎﾞ	内線 424 aomari@rss.gov.jo	1985	統括 1 学卒技術者 3 技術者 1 合計 5 合計 12	JISM UKAS	環境 食品 化粧品 消毒		・国内及び国際基準に則った科学的ｱｾｽﾒﾝﾄ ・高水準の教育ﾄﾚｰﾆﾝｸﾞ	ｼﾞｮﾙﾀﾞﾝ規格に基づく抗カビ､抗菌用塗料の試験応用。

要請ラボの概要(3/3)

センター名	ユニット名　または　ラボ名	連絡先 (E-Mail ｱﾄﾞﾚｽ)	創設年	構成員	ラボ認定	活動分野	活動内容	外部よりのニーズ・期待事項	将来計画
ERC	分光化学分析ﾗﾎﾞ	内線 394 osama1974@Hotmail.com	2003	統括 学卒技術者 技術者 合計	JISM	環境	（2002 年度試験実績：5760 件） （過去 3 年間の研究発表：12 件）	・国内及び国際規格に則った方法と分析装置による科学的調査 ・高水準の教育ﾄﾚｰﾆﾝｸﾞ	・国際認定の取得 ・環境分野に係わる全ての分野への分析業務拡大
BRC	ｺﾝｸﾘｰﾄﾗﾎﾞ	内線 763，757	1977	統括　3 学卒技術者　1 技術者　4 合計　8	JAS UKAS	建材	ｺﾝｸﾘｰﾄ及びそれによる建材製品の試験分析（2000 年度:9800 件、2001 年度、15，700 件、2002 年度：19700 件）	・国内建設事業者、関連官公庁・研究機関、建材関連者、品質管理者、学生、建材輸入業者などがこのﾗﾎﾞの業務に期待している。 ・近隣諸国からの依頼による特殊な試験研究も行う。	・ｱｶﾊﾞ経済特区のあるｼﾞｮﾙﾀﾞﾝ国南部地域に支店を開設する。 ・国内の二つの大学にｺﾝｸﾘｰﾄﾗﾎﾞを創設する。 ・機材設備のｱｯﾌﾟｸﾞﾚｰﾄﾞ
JISTC	標準校正	fawaz@rss.gov.jo		統括　3 学卒技術者　4 技術者　4 事務　1 合計　12	DKD JISM	電気 電子	・　家電製品及び小型電気部品の校正 (2002 年度院内構成業務実績：655 件) (2002 年度院外校正業務実績：653 件) ・　JISM との連携（JISM のﾃｸﾆｶﾙｱｰﾑとしての試験分析及びﾖﾙﾀﾞﾝ規格の検討） ・　国内あるいは国際規格認定取得のコンサル	・国際規格に相応する第 3 者検定機関	・National Calibration Laboratory の設立に伴う下記主要サービスの実施 ・トレーサビリティの確立 ・国家標準/規格の保全 ・参照標準と測定機器の校正 ・工業及び商業上のﾆｰｽﾞに答える認証付与と校正業務の実施。 ・法定計量に対する技術援助と試験の実施。 ・国家認証機構への技術的アドバイス ・国際計量標準（EUROMAT,OIML,EA,EU）への参画
	試験/品質管理	mmomani@rss.gov.jo		統括　3 学卒技術者　6 技術者　2 事務　1 合計　12	UKAS JISM SASO	電気 電子	・　家電製品及び小型電気部品の品質試験（2002 年度試験実績：1217 件） （2002 年度校正業務実績：1308 件） ・　電化製品品質向上コンサル ・　教育訓練	・近隣諸国（ﾚﾊﾞﾉﾝ、ｼﾘｱ、ｴｼﾞﾌﾟﾄ、UAE、ﾊﾟﾚｽﾁﾅなど）からのサービス需要が増大している。 ・国内需要者のための国産品及び輸入品の安全全盛適合確認と品質管理 ・国内電気/電子産業の抱える問題点解決と国際競争力のある品質づくり	・試験測定機器の向上による技術力の向上 ・専門的技術訓練を施すことで人的資源を向上する。 ・国内及び国際認証試験の範囲を拡大する。 ・ラボの活動範囲内においてあらゆる項目での認証試験を実施する。 ・ｼﾞｮﾙﾀﾞﾝ国内の様々な経済活動分野に対し、より専門的な技術試験やコンサルティングを行う。特に工業業分野に対しては緊急を要する。 ・試験分析業務分野の拡大 ・国産電気製品の品質向上に貢献し、国内市場及び世界の輸出市場に於ける競争力をつける。