JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF LOCAL ADMINISTRATION AND ENVIRONMENT (MOLAE)
THE SYRIAN ARAB REPUBLIC

THE CAPACITY DEVELOPMENT OF ENVIRONMENTAL MONITORING AT DIRECTORATES FOR ENVIRONMENTAL AFFAIRES IN GOVERNORATES IN THE SYRIAN ARAB REPUBLIC

PROJECT COMPLETION REPORT

《ANNEX 2》

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NIPPON KOEI CO., LTD.

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Operation and Maintenance (O/M) Manual

for Laboratory at Each DFEA

July 2007 (Version 2)

JICA Expert Team

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1.1 Scope and Application

1.1.1 Introductory to Laboratory Safety

A variety of hazards exist in the laboratory. The risks associated with these hazards are greatly reduced or eliminated if proper precautions and practices are observed in the laboratory. To manage these risks, and in response to a heightened concern for safety in the workplace, JICA Expert Team has developed this chapter. This chapter is intended to be the cornerstone of a safety program designed to aid staff in the DFEAs in maintaining a safe environment during analyses.

1.1.2 Laboratory Safety Objective

Laboratory Safety provides control measures essential for protecting all laboratory occupants from potential chemical and physical hazards. These controls consist of, but are not limited to, 1) policies, 2) guidelines, 3) training requirements, 4) standard operation procedures (SOP), 5) personal protective equipment, and 6) laboratory audits.

This chapter describes a minimum level of safe practices that are expected from all individuals involved in the laboratory operations.

1.1.3 Laboratory Safety Responsibilities

JICA Expert Team recognizes the need to use chemicals and other potentially hazardous materials for the purpose of analyzing. At the same time, JICA Expert Team is committed to ensure the safety of the employees, and visitors.

Considering this matter, JICA Expert Team has designated specific responsibilities for developing and implementing the Laboratory Safety to the Laboratory Safety Staff.

The Laboratory Safety Staff will complete the following duties:

1. Respond to chemical emergencies as needed.
2. Write, distribute, and update the Laboratory Safety Manual.
3. Ensure that the Laboratory has all of the needed equipment to pervert any accidents.
4. Ensure that the laboratory has all of needed caution sings.
5. Upon completion of repairs to safety equipment.
6. Oversee the Laboratory Staff with respect to inspections, hazard evaluations, and recommendations for compliance.

Note: All of the laboratory employees and visitors should follow and obey general safety rules, otherwise, the director should be reported.

1.2 Standard Operation Procedures

1.2.1 General Safety Guidelines

1. Always wear proper eye protection in dangerous chemical work (such as COD samples preparation and analysis). Contact lenses should normally not be worn. Fitted goggles are essential if, for therapeutic reason, contact lenses must be worn.
2. Always know the physical and chemical hazards associated with the materials that are being utilized in the lab.
3. Always wear appropriate protective clothing. For example, a suitable lab coat or apron.
4. Confine long hair and loose clothing. Do not wear high-heeled shoes, open-toed shoes, sandals or shoes made of woven material.
5. Always wash hands and arms with soap and water before leaving the work area. This applies even if you have been wearing gloves.
6. Never perform any hazardous work when alone in the laboratory. At least two people should be present.
7. Be familiar with the location of emergency equipment - fire alarm, fire extinguisher, emergency eye wash and safety shower. Know the appropriate emergency response procedures.
8. Use equipment and hazardous chemicals only for their intended purposes.
9. Never mouth pipette chemicals when transferring solutions. Instead, you should always use a mechanical pipette or pipette bulb to transfer solutions.
10. Use a hood whenever there is a possibility of poisonous or irritating fumes being emitted from the chemicals being utilized.
11. Never leave an experiment unattended while it is being heated or is rapidly reacting.
12. Keep equipment back from the edge of the lab bench to prevent spillage.
13. Support all beakers and flasks with clamps. Do not use cracked or chipped glassware.
14. Use extreme caution with flammable solvents.
15. Read all labels on chemicals carefully before using them in the lab.
16. Report any accident immediately.

1.2.2 Eating, Drinking, and Smoking

Eating, drinking, smoking, gum chewing, applying cosmetics, and taking medicine in laboratories where hazardous chemicals are used is strictly prohibited.

1. Food, beverages, cups, and other drinking and eating utensils should not be stored in areas where hazardous chemicals are handled or stored.

2. Glassware used for laboratory operations should never be used to prepare or consume food or beverages.
3. Laboratory refrigerators, ice chests, cold rooms, ovens, and so forth should not be used for food storage or preparation.
4. Laboratory water sources and deionized water should not be used for drinking water.
5. Laboratory chemicals should never be consumed or tasted.
6. Do not smoke in chemical laboratory. Be aware that tobacco products in opened packages can absorb chemical vapors. For this reason, laboratories will never be considered smoking areas.

1.2.3 Housekeeping and Maintenance

In the laboratory, keeping things clean and organized can help provide a safer environment. Keep drawers and cabinet doors closed and electrical cords off the floor to avoid tripping hazards. Keep aisles clear of obstacles such as boxes, chemical containers, and other storage items that might be put there. Avoid slipping hazards by cleaning up spilled liquids promptly and by keeping the floor free of loose equipment such as glass beads, stoppers, and other such hazards. Never block or even partially block the path to an exit or to safety equipment, such as a safety shower or fire extinguishers. Use the required procedure for the proper disposal of chemical wastes and solvents.

The work area should be kept clean. Clean the work area upon completion of a task and at the end of the day. The custodial staff is only expected to perform routine duties such as cleaning the floor and emptying the general trash.

In preparation for any maintenance service such as, fume hood repair, plumbing, electrical etc. the laboratory staff must prepare the laboratory before the maintenance personnel arrive. Whenever possible remove hazards that maintenance personnel may encounter during their work activities. For example, infectious agents, radioactive materials or chemicals must be moved to a secure area prior to initiation of maintenance work.

1.2.4 Hazardous Waste Storage and Disposal

Individual users of hazardous materials have specific duties and responsibilities. These responsibilities include hazardous waste identification and waste minimization as well as proper waste storage and disposal. Following notes should be taken into account.

1. Hazardous waste must be handled carefully and cannot be recycled or treated on-site.
2. All waste must be labelled properly. Container labels must match the information which appears on the hazardous waste pickup request form.
3. The waste must be packed in sturdy containers weighing no more than about 20 kg. Containers must be in good condition and compatible with the chemicals they contain.
4. Staff in the laboratory should not accept containers which are damaged or show evidence of

leakage.

5. Individual waste bottles or cans in the container must be packed with crumpled newspaper to prevent breakage and to protect them during transport.

1.2.5 Spills and Accident Reporting

Spills

It is the responsibility of each individual using hazardous materials to become familiar with the emergency response procedures dictated by the manufacturer of such materials. Small spills and minor incidents should be handled by properly trained laboratory personnel.

The following general rules should be followed in the event of a major hazardous materials spill or other incident:

1. Quickly evaluation the situation

   Ask the following questions:
   Is someone injured or requires immediate medical attention?
   Is the spill manageable with the personnel and resources in the laboratory?
   Is there a danger to others outside the laboratory?

2. Activate evacuation (fire) alarm, if necessary, for the building

   Be familiar with the sound of the alarm system in your facility. If the spill/incident could threaten the health of individuals in the building, activate the alarm.

3. Call 113 for help

   Tell 113 dispatchers as much detail as possible about the spill/incident. If possible, locate a Material Safety Data Sheet.

4. Attend to life-threatening injuries

   The primary concern in the event of an emergency is to protect life and health of others. Only give first aid treatment to the level at which you have been trained.

5. Assist emergency responders as needed

   Emergency assistance should be summoned, then they will arrive on scene and take control of the incident. Cooperate with them to the fullest extent possible.

Accident Reporting

All accidents should be recorded and reported to the Director of the DFEA, then to the GCEA.

1.3 Standard Laboratory Control

Laboratories should be designed to limit specific hazards in a controlled environment. Once new hazards are introduced into a laboratory environment, the laboratory may need to be modified in some respect to mitigate or avoid an undesirable or adverse condition arising from the new hazard. There are a variety of facility designs and engineering controls that can be utilized in a laboratory to control chemical or biological hazards.

1.3.1 Ventilation

The importance of clean uncontaminated air in the laboratory work environment is well known. Ventilation controls should be readily available and easily accessible to ensure that the laboratory air is continuously replaced and that concentrations of toxic substances do not increase during the workday. Additionally, the ventilation system should ensure that the toxic substances are not recirculated from laboratory to laboratory or within the building. There are two main types of ventilation systems, 1) heating, ventilation and air conditioning (HVAC), and 2) local ventilation.

1. HVAC systems are designed primarily for temperature, humidity, and air quality.

2. Local ventilation systems are designed to remove the contaminants generated by an experiment or device to the exterior of the building.

1.3.2 Safety Equipment

All laboratories should be provided with safety showers, eyewashes, and appropriate fire extinguishers. Adequate ventilation, wash sinks, and approved waste disposal receptacles are also necessary. All of these should be conveniently located, properly maintained, and frequently tested. Special consideration should be given to ensure accessibility to safety equipment as well as ease of evacuation of physically disabled individuals.

1) Fume Hoods
2) Hand wash Stations
3) Safety Showers
4) Eyewash Stations
5) Fire Extinguishers
6) Safety Containers for Flammable Liquids
7) Flammable Storage Cabinets
8) Corrosive Storage Cabinets
9) Biological Safety Cabinets
10) Autoclaves
11) Refrigerators

1.3.3 Personal Protective Equipment

Clothing

Loose or torn clothing can fall into chemicals or become ensnared in equipment and moving machinery. Aprons, lab coats, and other protective clothing, preferably made of chemically inert material, should be readily available and utilized in a laboratory environment. Hair should also be restrained because loose hair can catch fire or dip into chemical solutions. A laboratory coat or an apron should be worn when working with hazardous chemicals. This is particularly important if personal clothing leaves skin exposed. Since many synthetic fabrics can adhere to the skin when burning, and thereby increase the severity of a burn, cotton is the preferred laboratory clothing fabric.

Eye and Face Protection

Laboratory work may require eye and face protection to reduce the possibility of chemical exposures due to splashes. Eye protection is usually required of everyone who enters a chemical work area. The type of eye protection needed depends on the circumstances. Typically, safety goggles that protect the top, bottom, front and sides of the eyes is mandatory. Safety goggles should not be worn in conjunction with contact lenses, except for therapeutic reasons. If contact lenses are worn the co-workers should all be aware of this, in case an accidental splash renders the wearer of such lenses incapable of washing or rinsing his or her eyes.

Face shields are necessary when working with severely corrosive liquids, with glassware under reduced or elevated pressure, with glass apparatus used in combustion or other high-temperature operations, and when there is a possibility of an explosion or implosion.

Hand Protection

The purpose of gloves is to protect against abrasions, cuts, punctures, snags, chemical burns, thermal burns, and temperature extremes in the work environment. There is a variety of gloves on the market to choose from depending on the chemical, the instrumentation, and the environment in which the hazardous material will be handled.

Respirators

In a laboratory environment respirators may sometimes be relied on if the engineering controls and laboratory design do not adequately limit the potential exposure to hazardous air contaminants. The proper selection and type of respirator used should be based on a thorough analysis of the specific activity planned.

1.4 Safe Handling Requirements in the Laboratory

Seventy eight percent of laboratory accidents are due to human error according to statistical data.

When operational requirements for safe handling of chemicals in the laboratory are followed, the chance of an accident due to human error will be reduced.

1.4.1 Hazard Identification

Flammable liquids, toxic chemicals and highly reactive chemicals must be handled in a manner which poses no substantial hazard to human health and will not be deliberately discarded with the general waste or by any route into the sanitary sewer system.

While chemical hazards are probably the most widely recognized in the laboratory environmental there are other potential hazards which need to be identified. These include biological, radioactive, electrical, mechanical and physical. It is important that all potential hazards in the laboratory environment be evaluated and controlled as much as possible.

1.4.2 Labelling

There are generalized labelling practices that have been established to protect laboratory employees from physical and health hazards associated with working with hazardous chemicals.

These labelling practices require that:

1. Labels on incoming containers of hazardous chemicals must not be removed or defaced.
2. All chemical containers used in the work place must, as a minimum, be labelled with the identity of the hazardous chemical and appropriate physical or health hazards.
3. Chemicals received from the manufacturer or distributor must also be labelled with the name and address of the chemical manufacturer or distributor.
4. When material is transferred from a labelled container to an unlabeled container, a label must be placed on the unlabeled container. The new container of chemicals must be labelled with the identity of the chemical(s) as well as with appropriate physical or health hazards.

1.4.3 Common Chemicals and their Hazards

It is the responsibility of every individual who handles chemicals to be aware of the specific hazards and handle them in a safe manner. This responsibility begins once the material is received at the laboratory and ends only after the material has been disposed of in accordance with applicable federal and state guidelines.

The following are general guidelines for general chemical storage and transport:

1. All hazardous chemicals must be stored in a manner to minimize exposure to personnel. All chemicals should be dated as to when received and again when opened.
2. Peroxide forming compounds (e.g., ether, dioxane) must be discarded six months after opening, or one year after receipt which ever comes first.
3. Acids and bases must not be stored in flammable cabinets. Acids should be separated from

bases.

4. Incompatible chemicals must not be stored together.
5. Large volumes or numerous bottles should be transported on carts. Carts used for transporting hazardous substances should have sides of sufficient height to restrain containers on the cart.
6. Avoid lifting containers solely by the neck ring whenever possible.

Safety in our laboratories is the most important consideration of the laboratories. Successful laboratory operation requires full knowledge of the common chemicals and their properties. To enhance safety in the laboratories, we recommend that chemical users should make reference to the pages below of common chemicals used in the laboratories. Further information is available from material safety data sheet. (MSDS).

1.4.4 Storage of Incompatible Chemicals

Certain hazardous chemicals cannot be safely mixed or stored with other chemicals because a severe reaction can take place or an extremely toxic reaction product can result. The labels and MSDSs for hazardous chemicals will contain information about their incompatibilities. The following is a table containing examples of incompatible chemicals.

Substances in the left hand column should be stored and handled so that they can’t accidentally contact corresponding substances in the right hand column under uncontrolled conditions.

Normal Incompatible Substances List

Substances	Incompatible Substances
Acetic acid	Chromic acid, nitric acid, peroxides, permanganates
Alkali and alkaline earth metals	Carbon dioxide, carbon tetrachloride, other chlorinated hydrocarbons
Ammonia (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrogen fluoride
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organics, combustibles
Bromine	Ammonia, acetylene, butadiene, butane, other petroleum gases, sodium carbide, turpentine, benzene, finely divided metals
Sodium oxide	Water
Chlorine	Ammonia, acetylene, butadiene, butane, other petroleum gases, hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, any flammable liquid, combustible materials, aniline, nitromethane
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Phosphorus (white)	Air, oxygen
Phosphorus pentoxide	Alcohols, strong bases, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Any oxidizable substance, such as oxidizable substance, such as ethanol, methanol, glacial acetic acid, acetic anhydride, enzaldehyde, carbon disulfide, glycerol, ethylene glycol, ethyl acetate, methyl acetate, and furfural
Sulfuric acid	Chlorates, perchlorates, permanganates

1.5 Electrical Wiring in Laboratories

Electrical apparatus can be dangerous when handled incorrectly and may cause accidents such as electric shocks, fires and explosions. Thus, a sufficient knowledge of eclectic equipment is required and care must be taken with its handling.

1.5.1 Electrical Shock

Electric shock means that electricity through (part of) the human body. This is the most direct form of electrical accident, and the one that causes fatalities from time to time.

Electric shocks occur when electricity shorts from exposed cable of such like to the earth or between cables via human body due to contact or close proximity to the areas of the electrical apparatus or cables which are electrically live or electro statically charged.

The degree of electric shock is significantly different depending on the amount of electrical current passing through the body as well as the route of current flow. Electrical shocks affect people differently depending on their condition, age and sex, while the effect an individual receivers differs depending on his/her own condition at the moment of the accident as well.

Effects of the Electrical Current (AC 50-60 Hz)

Electrical Current	Effects on human body
1mA	Sensible
5mA	Painful
10mA	Unbearably painful
20mA	Impossible to escape from the affecting electrical circuit due to involuntary muscles contraction.
50mA	Difficult to breathe, very critical condition.
100mA	Almost fatal condition.

Effects of Voltage

In case of contact		In case of close proximity	
Voltage	**Effects on human body**	**Voltage**	**Safe distance (cm)**
10V	Potential inclination of 10V/m is the limit if the whole body is submerged in water.	3kV	15
20V	Safety limit if making contact with a wet hand.	10	20
30V	Safety limit if making contact with a dry hand.	20	30
50V	Safety limit to avoid risk of fatality.	30	45
100~200V	Rapidly increased risk	60	75
200V or more	Fatal condition	100	115
Approximately 3000V	Physically attracted to the electrically charged area.	140	160
10kV or more	May survive if thrown off.	270	300

1.5.2 Electrical Fire

Other accidents caused by electricity include fires and explosions. There can be caused if ignitable or inflammable substance or combustible gas and dust, etc. exist in situations where heat or electric sparks are generated, as shown in the table.

Major Causes of Electrical Accident

Heat Generation	1. Generation of Joule's heat due to current leaking. 2. Heat generation due to excessive load on equipment or power lines. 3. Heat generation due to imperfect connection at the cable joints.
Sparking	1. Sparks and electric arc when switches are turned on/off. 2. Sparks if cables are short –circuited. 3. Sparks due to static electricity charge.

Notes on Handing Electrical Equipment

Power source (Switchboard)	The total electrical requirement of units used should not exceed the allowable current of fuse at power source. Switchboard accommodating the main switch for whole rooms should be located in corridors .However, wiring for lights should be independent.
Switches	Fuse with a higher rated value than the allowable current of power source switch must not be installed .Individual switches should be installed per unit of equipment.
Cable (cord)	Rated current for electrical apparatus should be checked carefully, and power cables whose permissible current exceeds both the fuse capacity and electrical requirements of the equipment should be used .Decrepit cords or cords whose insulation covering has broken must not be used .Heat –resistant cords must be used for heaters. Cable cords must be suitable for use on floors and in humid areas.
Wiring (Electrical engineering)	Care must be taken to connect cables to equipment correctly to prevent imperfect contact .Soldering should be applied to connect the cables with each other, Which should then be sufficiently covered with insulation type .When installing cables ,care must be taken to prevent cables from being stepped on or tripped over ,and cables mustn't be tied together .Also ,be careful that they are not affected by humidity ,chemicals and gases .Power supply and distribution facilities must be installed by professional technicians .
Electrical apparatus	Loads exceeding the specified capacity mustn't be applied ,otherwise the transformer and/or motor may burn out due to excessive heat .Take note that the actual electrical power in use is different from the rated capacity .With certain types of equipment (i.e. rotating machine),excessive loads can be applied when the power is turned on after a power outages ,which may cause a fire due to excessive heat .It is Recommended that a safety circuit such as a protection relay be attached to electrical furnace, constant temperature oven and exhaust pump that operate throughout the night .Explosion –proof type is desirable for drafts, electric refrigerators and dryers as solvent vapor or gas are use.
Power supply interruption /others	Power switches must be turned off when leaving the room after completing experiments .In particular ,care must be taken not to forget to turn off power switches when terminating experiments at night and leaving the room in case of power supply interruption .Appropriate measures such as improvements in stability with power supply and installation of backup power sources for safety system and equipment that may cause accident in the event of power supply interruption (i.e. life support system and cooling systems to prevent explosions)must be established .

1.6 Emergency and Medical Procedures

1.6.1 Basic Emergency Response

An emergency situation is declared if a release or spill of a hazardous substance occurs that poses a significant threat to the health and safety of the laboratory, and staff.

The most important fact to remember in an emergency situation is to remain calm. Step away from the incident momentarily, to access the magnitude of the situation and to determine the following information:

Is the situation life threatening?

Are there people injured?

Is there a persisting danger (Example: fire)?

What agent caused the emergency situation (biological, chemical, or radiological)?

Major Release

1. Assess the situation
2. If there is an immediate danger to life and health call 110 or 113.
3. Pull the fire alarm and evacuate the area immediately.
4. Evacuate and secure the area as much as possible without risking injury.
5. Assist emergency responders by giving as much info as possible upon their arrival.
6. Record events as much as possible for post emergency response work.

1.6.2 Injury and Illness

For minor injuries first aid kits should be accessible and fully equipped for use. First aid kits are only recommended for incidents that do not require emergency care. It is essential to ensure the availability of proper first aid treatment supplies in case of an accident. You should always check that:

1. Always have the first aid equipment readily available.
2. Keep essential supplies in the first aid kit at all times.
3. Document the work related injury or illness.
4. Ensure that the injured person(s) receive prompt medical treatment.

1.7 Helpful Telephone Numbers and Useful Information

Civilian Ambulance	110
Police	112
Fire Fighting	113
Water Maintenance	114
Electricity Maintenance	117
JICA Expert Team	011-4464796

1.8 Safety Appendix

1.8.1 Fire Extinguishers and Building Evacuation Procedure

Fire Extinguishers **طفايات الحريق**

نوع الطفاية	أنواع الحرائق*		
	نوع A	نوع B	نوع C
	المواد العادية مثل الورق، الخشب، القماش، البلاستيك، ...	السوائل القابلة للاشتعال ، البنزين، الكير وزين، المذيبات العضوية، الزيوت، الشحوم ...	الحرائق في المعدات الكهربائية.
رغوة	غير مستحسن	ممتاز	لا
CO_2	غير مستحسن	ممتاز	ممتاز
البودرة الجافة	ممتاز	ممتاز	ممتاز
الهالون	غير مستحسن	ممتاز	ممتاز

* إضافتا إلى الحرائق من نوع D: الفلزات القابلة للاشتعال مثل البوتاسيوم، الصوديوم، المغنيزيوم، الزركزنيوم، و التيتانيوم.

Building Evacuation Procedure **إجراءات إجلاء المبنى**

1	2	3
شغل جرس الإنذار	اخرج من المبنى بهدوء و انتظام	اتجه نحو نقطة التجمع
		

1.8.2 Safety Sings

2 MANAGEMENT AND HANDLING OF REAGENT

2.1 Proper Approach to Accurate Analysis (Outline)

In terms of the management and handling of chemicals for analysis and measurements, it is fundamentally important for managers and employees to fully understand the chemical and physical natures of such chemicals.

There are a variety of chemical types and each has a different nature. Knowledge, insight and the ability to fully understand the chemical and physical reactions and changes that may occur in its handling are required of the involved in handling them, as well as following the operations manual. In order to do this, self-study, education and training are indispensable.

2.2 Grasping the Stock Amount of Reagents

The chemical reagents that are mainly used for environment monitoring fall into many different classifications in terms of type, quantity and purity, etc. depending on their use. Accordingly, managers and staff members must fully understand the quantity to be used in line with their purpose and the quantity stocked in the laboratory. Efforts must be made to manage, replenish and ensure safety of stocks to avoid any problems with test/experiments or excessive or inadequate stockpiling in cooperation with each other.

2.3 Reagent Storage and Management Ledgers

Notebooks or PCs should be used to make management records. Names and types (i.e. acid/alkaline, solid/liquid, inorganic/organic), quantity (number of bottles), purity, purpose, the term of validity, storage site (i.e. room temperature, cooling, dark place), and type of danger (i.e. deleterious, poisonous, inflammable, ignitable, or explosive substances), etc. of the chemical to be stored should be recorded. They should be clarified per nature and appropriate storage methods and sites must be decided. All employees involved in laboratory operations must know about these record ledgers**.**

2.4 Storage of Standard Reagents and Maintenance Accuracy

It is important to maintain the accuracy of standard solutions for use instrumental analysis, but such accuracy may be degraded depending on the usage method and storage management.

Measuring bottles such as volumetric flasks should not be used for storing standard solutions.

Plastic bottles are normally used for storage. Bottles previously used for strong acids such as hydrochloric, nitric or sulfuric acid can be used to store solutions for precise analysis as elution of impurities is minimal.

There are several storage conditions, which are room temperature, cooling and dark place, etc., but chemical such as standard metal ion solution that are to be used at room temperature can, as a general rule, be stored at room temperature without cooling.

Standard solutions to be used for oxidization/reductions such as potassium permanganate, potassium dichromate solution, iodic acid solution should not be placed in direct sunlight, and should be stored in the dark or in brown bottles.

Organic compounds that are diluted with organic solvents should be stored in cool and dark places as they are highly volatile. In this case, storage should be carried out in accordance with usage/storage instructions of the manufacturer with regard to the nature of the chemical. Most are used at room temperature, but care must be taken with handling, as concentration calibration may be required due to temperature and air pressure.

2.5 Safety Measures

There are many dangerous chemicals used in laboratories. These include poisons and deleterious substances that must be reported officially in line with government regulations.

Care must be taken concerning the following points for those chemicals.

1. Measures to prevent their loss or theft must be taken.
2. Measures to prevent those chemical being scattered, leaked, discharged, leached as well as permeated into the ground must be taken.
3. In the event that they are lost or stolen, it must be reported immediately to the police, public health center or fire authorities if there is any health or hygiene-related risk.

General, bulk volumes of dangerous chemicals must be kept in storage or a room that can be locked and only the minimum volume required should be put in the laboratory.

They should be classified in accordance with the potential danger, such as toxicity, flammability and dangerous reaction by mixing, and stored separately in a cupboard or shelf. In the event that containers are damaged for any reason, great care must be taken in case of the generation of fire or explosion due to mixing of two or more reagents.

Countermeasures to prevent chemical bottles from falling from shelves are also important to avoid accidents due breakage. Thus, a guardrail should be attached to the shelf. Care must also be taken to prevent bottles from mutually clashing due to vibrations as well preventing their

falling down.

As a precaution in case of an accident, the safety chapter detailing first aid procedure in the vent that someone is injured and how to extinguish any fire, as well as a network of emergency contact numbers should be prepared. This would best be placed where all staff can easily see it. It is also important for safety measures training to be carried out for staff once or twice a year simultaneously with maintenance and check of the system and equipment.

2.6 Reagents Requiring Special Care for Storage

Reagent requiring special care for storage can be classified as shown in the table

Characteristics of Dangerous Substances

Types	Characteristics	Substances examples
(1).Oxidizing solids	Discharge oxygen; react with combustible substances and cause fire or explosions.	Chlorates. Sodium peroxide, Hypochlorite etc.
(2).Flammable solids	Easily catch fire at low temperature.	Metal powder, i. e .Red phosphorus, Al and Mg Solid alcohol etc.
(3).Spontaneous ignitable substances and water prohibited substances	Ignite through reaction with air or water.	Alkali metals (Na, Li etc), Alkali earth metals (Ca, Mg, Ba etc.) Hydride.
(4).Inflammable liquids	Easily catch fire	Various solvent, Ether, Gasoline etc.
(5).Self-reacting substances	Catch fire on heating or impact, and may burn or explode.	Nitric esters, organic peroxides, Nitro compounds, etc.
(6)Oxidizing liquids	Strongly react with flammable substances and intensify combustion.	Perchloric acid, Chlorine fluoride, etc.

2.6.1 Oxidizing Solids

These are solid oxidizing agents that react strongly and intensify combustion when mixed and heated with substances that easily be oxidized (i.e. combustibles, organic substances, reducible substances, and powdered metal). They may explode under the following conditions.

1. As the substance itself is unstable, it may explode on heating, impact or if subjected to friction.

2. If mixed with easily oxidized substances, it may explode on heating, impact or if subjected to friction.
3. May explode on addition of strong acid.
4. May generate heat if reacts strongly with water and its sufficient quantity may cause explosion.
5. May explode on drying after being absorbed into wood or paper due to deliquescence.
6. The above applicable conditions are described for the compound in the table

Examples of Oxidizing Solids

Substance Name	Examples of Compounds & Type of Risk in Parentheses
Chlorate Perchlorate Chlorite Hypochlorite Iodate	$NaClO_3$(1-2-3-5), NH_4CLO_3, $Pb(CLO_3)_2$, (1-2-3) $NaClO_4$, $KCIO_4$, $NHCIO_4$, (1-2-3-5) $NaClO_2$, $KClO_2$, $Cu(CIO_2)_2$, (2-3) $Ca(ClO)_2$, Bleaching powder(2) $NalO_3$, KlO_3 (2)
Permanganate Dichromate	$KMnO_4$, $NaMnO_4$ (2-3) $Na_2Cr_2O_7$, $K_2Cr_2O_7$(2)
Nitrate Nitrite	$NaNO_3$, KNO_3, $Ba(NO_3)_2$, (2-3) $NaNO_2$, KNO_2 (2)
Inorganic Oxides	Li_2O_2, Na_2O_2, K_2O_2 (2), MgO_2, CaO_2, SrO_2, BaO_2, PbO_2 (2)
Peroxodisulfate Peroxo Borate	$(NH_4)_2S_2O_8$ (2) NH_4BO_3 (2-3)
Oxides of Cr, Pb and I	CrO_3 (2-3), PbO_2 (P), I_2O_5 (1-2)

Figures in parentheses are the above condition numbers. (***P***) Indicates poison

Points to Note on Handling

- *Must be tightly sealed and stored in a cool and dark place away from fire and heat sources, and care must be taken not to subject them to shock.*
- *Must not be mixed with easily oxidized substances, or come into contact with acid or water.*
- *Substances with deliquescence must be tightly sealed and care must be taken that they are not affected by humidity.*
- *Unstable substances must not be stored for prolonged period.*
- *Protective goggles/ face protectors should be used and heatproof clothing worn if required.*
- *If a fire generated, large amounts of water should be used to extinguish the fire and cool it down. However; dry sand or a carbon dioxide gas fire extinguisher should be used for alkaline metal peroxides as they react strongly with water.*

2.6.2 Combustible Solids

These are solids that easily catch fire at low temperature and burn intensely once alight. Spontaneous ignition, or explosion or generation of poisonous gases may be generated in the following cases:

1. On contact with oxidizing agents.
2. If minute particles catch fire.
3. If subject to strong friction.
4. Spontaneously ignitable on contact with humidity in air, oily cloths or metal chips.
5. Generates poisonous gas on reaction with water or burning

Examples of compound and applicable conditions are described in the following table

Examples of Combustible Solids

Substance Name	**Examples of Compounds & Type of Risk in Parentheses**
Phosphorous sulfide	P_4H_3, P_4S_7 (3-5) P_2S_5
Powdered metal	Fe, Al, Zn, Mg, (including ribbon shape) (1-2)
Others	Red Phosphorous (1-2 highly poisonous), sulfur(1-2-4-5)
Flammable solids	Solid alcohol, lacquer putty, rubber cement etc.(1)

Figures in parentheses are the above condition numbers.

Points to Note on Handing

- *Should be stored in a cool dark place away from fire and heat sources, and contact with oxidizing substances must be avoided.*
- *Phosphorus sulfide and powdered metal must not come in contact with water.*
- *Protective method: Mask and gloves should be used when handling large quantities.*
- *Fire extinguish: Generally, water can be used to extinguish a fire, but powder extinguisher or sand is better for powdered metal.*

2.6.3 Spontaneously Ignitable Substances and Water Prohibited Substances

Generate combustible gases or fire on contact with water or on exposure to air, and have the following risks.

1. Spontaneously ignitable on contact with air.
2. Generate fire by powerful reaction with water and may explode and scatter out depending on the situation.
3. May explode on mixing with oxidizing agent.
4. Generate combustible gases on reaction with water and may catch fire.
5. Generate poisonous gases on burning.

Examples of substances are shown in the following table.

Spontaneous Ignitable Substances and Water-Prohibited Substances

Substance Name	Examples of Compounds & Type of Risk in Parentheses
Alkali metal Alkaline earth metal	Li(4:H_2), Na, K(1-2:H_2 ***C***) Ca,Ba(2:H2)
Alkyl aluminum Alkyl lithium Alkyl zinc	$(CH_3)_3Al$, $(C_8H_5)_3Al$, $(C_2H_7)_3Al$, (1-2:C_nH_{2n+2}) CH_3Li, C_2H_5Li, (1-2:C_nH_{2n+2}) $(C_2H_5)_2Zn$ (1-2;C_2H_6)
Metal hydride Metal Phosphide Metal carbide Phosphorus Silicon chloride ompounds	LiH (4:H_2), NaH (3-4), CaH_2 (3-4, ***P***) Ca_3P_2 (2:C_2H_2), Al_4C_3 (2:CH_4) CaC_2 (2:C_2H_2), Al_4C_3 (2:CH_4) P_4 (Yellow Phosphorus) (1-2:***P:C***) $SiHCl_3$ (1-3-4:HCL:***P***)

Figures in Parentheses are the above condition numbers. (***P***) Indicates poison, (***C***) Indicate corrosive to the skin and the chemical symbols indicate which gas will be generated.

Points to Note on Handling

- *Should be tight sealed to prevent contact with air and stored away from combustibles. Should be soaked in water or protective oil-based agent, and care must be taken that they are not damaged as well as storing them in an external cylinder when inert gases used to enclose them.*
- *Water- prohibited should be tightly sealed to prevent contact with water and stored in cool, dry and dark places above floor level.*
- *In case where the substances are diluted with solvent, care must be taken that the solvent does not evaporate off.*
- *For protection, pincette or rubber gloves should be used instead of using bare hands to handle such substances, and a poison- proof mask should also be used when handling powerful poisons.*
- *A powder extinguisher or dry sand should be used to extinguish any fire instead of pouring water or using a water-based extinguisher.*

2.6.4 Inflammable liquids

These include alcohol, petroleum, animal and vegetables oil, and their flashing point is from below 100 to over 200 C. They fall into several categories in accordance with their ignition level. Generally, there are the following risks of explosion or impediment.

1. Their ignition point is low and they burn explosively.
2. As their boiling point and minimum explosive point are low, they flash easily and may explode.

3. Peroxide is generated on contact with light and air for prolonged periods and may explode.
4. They are decomposed by heat or light and may explode.
5. Generated heat by polymerization accelerates reaction leading to explosion.
6. Attract static electricity during transfer and flash and flash easily.
7. May spontaneously ignite on absorption into cloth, etc.
8. Generate poisonous volatized gases.

Examples of substances are shown in the following table.

Major Inflammable Solutions

Substance Name	Examples of Compounds & Type of Risk in Parentheses
Special inflammable substances	$C_2H_5OCH_5$ (1-2-3-6-8), CS_2(1-2-6-8), CG_3CHO(2-4-8), CH_3-O-CH_8 (Propylene oxide) (2-5-8)
Petroleum Type 1 Flash point is below 21^oC	(Water –insoluble) gasoline, C_6H_6 (2-6-8), $C_6H_5CH_3$, $CH_3COOC_2H_5$ (2-6), (Water -insoluble) CH_3COCH_3 (2), C_5H_5N (pyridine) (2-8)
Alcohol Alcohol value 1 with carbon number of 3 or less	(Water -insoluble) CH_3OH(2-8), C_2H_5OH,C_3H_7OH (2)
Petroleum Type 2 Flash point: 21~ 70 ^oC	(Water - insoluble) Kerosene, light oil , 2 $C_6H_4(CH_3)_2$ (6-7), (Water - insoluble) HO-CH_2-CH_2-OH (glycol), $HOCH_3$-CH(OH)-CH_2OH (glycerin)
Petroleum Type 4 Liquefy at 20 ^oC; flashing point of 200 ^oC or higher	Lubricating oils (i.e. machine oil motor oil ,etc),others
Animal /plant oil Crude and refined oils; liquefy at 20 ^oC	Vegetable oils (i.e. palm, olive, castor, and rapeseed oils, etc.), and fish oils (i.e. herring and sardine oil, etc.)

Figures in Parentheses are the above condition numbers.

Points to Note on Handling

- *Highly inflammable substances should be separated into small quantities and stored in well-ventilated sites away from fires risks (i.e. power switches, places where static electricity and sparks are easily generated, red hot body), and vapor must not be allowed to leak from container.*
- *Protective methods: protective masks and cotton gloves should be used when handling large quantities, and poison-proof masks and rubber gloves should be worn then handling poisons.*
- *Fire extinguishing method: CO2 extinguisher should be used for small fires and a large amount of water should be used if the fire increases.*

2.6.5 Self-reacting Substances

Generate self-reaction on heating, impact, and friction, and under light, etc., and the reaction accelerates explosively with heat. These are risks as follows.

1. Explode on heating, impact, and under light.
2. Incinerate or explode on contact with strong acid.
3. Burn or explode on mixing with organic substances, halogens and sulfur.
4. Generate fire on natural decomposition and may explode.
5. Decomposition gases may explode.
6. Highly inflammable and explode on combustion.

Substance examples are shown in the following table

Major Self-Reacting Substances

Substance Name	Examples of Compounds & Type of Risk in Parentheses
Organic peroxides	Benzoyl peroxide(1-2-3), methyl ethyl ketone oxide(1-4)
Nitrate ester	CH_3NO_3,$C_2H_5NO_3$(6), Nitroglycerine (1***E***), nitocellulose(1-4***E***)
Nitro compounds	Piciric acids, trinitrotoluene (1-3-6***E***)
Nitroso compounds	Dinitro pentamethylene tetramine (1-2-3)
Azo compounds	Azo-bis-iso-bulyronitrile (1-2-3)
Diazo compounds	Diasonitrophenol (1***E***)
Hydrazine delivertives	Hydrazine sulfate (***C***)
Metal azo compounds	NaN_3 (sodium azide) (5***C***)
Others	Guanidine sulfate (1)

Figures in Parentheses are the above condition numbers. (***C***) Corrosive to the skin; (***E***) explosives

Generally, compounds with the following structure in the table below are defined as highly explosive substance. Explosive power and sensitivity differ depending on the substance, but great care must be taken with handling them.

Highly Explosive Chemical Combinations

Chemical Structure	Name
<u>Substances with N-O</u>	
-O-NO_2	Nitrate ester
-NO_2	Nitro Compound
>N-NO_2	Nitraomine
N-HNO_3	Amine nitrate
-NO	Nitroso compound
-ONC	Fulminate

Substances with N-N	
-N≡ N+	Diazonium salt
-N=N-C≡N	Diazocyanide
$(-N=N)_2S$	Diazosulphide
$-N_3$	Azides
Substances with N-M	
N-M	Metal nitrite
M_2-NH	Metal imide
$M-NH_2$	Metal amide
Substances with O-O	
-OO-H	Hydro-perxide
-OO-	Peroxide
CO-OO-H	Peroxic acids
O_3	Ozonides
Substances with O-X	
$N-HClO_4$	Amine-Perchlorate
$-OClO_3$	Perchlorate-ester
N-HClO	Amine chloric acid
$C-OClO_2$	Chlorate –ester-
$-ClO_2$	Hypochlorite

Points to Note on Handling

- *Should be stored in cool places with good ventilation away from fire, and should not be subjected to shock or friction.*
- *Protective means: Protective masks should be worn when large quantities are handled or heated, and rubber gloves should be worn handling corrosive substances.*
- *Fire extinguish methods : Normally, a large amount of water is used foam extinguishers can be used, but if the intensity of the fire is not reduced, it may explode, so it is also important to carefully judge evacuation timing..*

2.6.6 Oxidizing Liquid

The Substances themselves are incombustible liquid, but the following risks exist depending on thee situation due strong reactions with combustibles, reducible substances and metal powder.

1. May generate fire or explode on mixing with combustibles such as metal powder or alcohol, and organic substances such as amine and hydrazine.
2. Strongly react with water and generate heat and oxygen.

3. Spontaneously ignitable on contact with organic substances such as sawdust.
4. Decompose on heat/ light.
5. Bromine fluoride compounds give off fluorine on reaction with many substances.

Major oxidizing liquid examples are shown in the following table.

Major Oxidizing Liquids

$HClO_4$ (Perchloric acid) (1-2-3-**C**), H_2O_2 (hydrogen peroxide) (1-4-***C***), HNO_3 (nitric acid ,fuming nitric acid) (1-3 ***P***, ***C***), BrF_5 (bromine pentafluoride) (2-5-***P, C***)

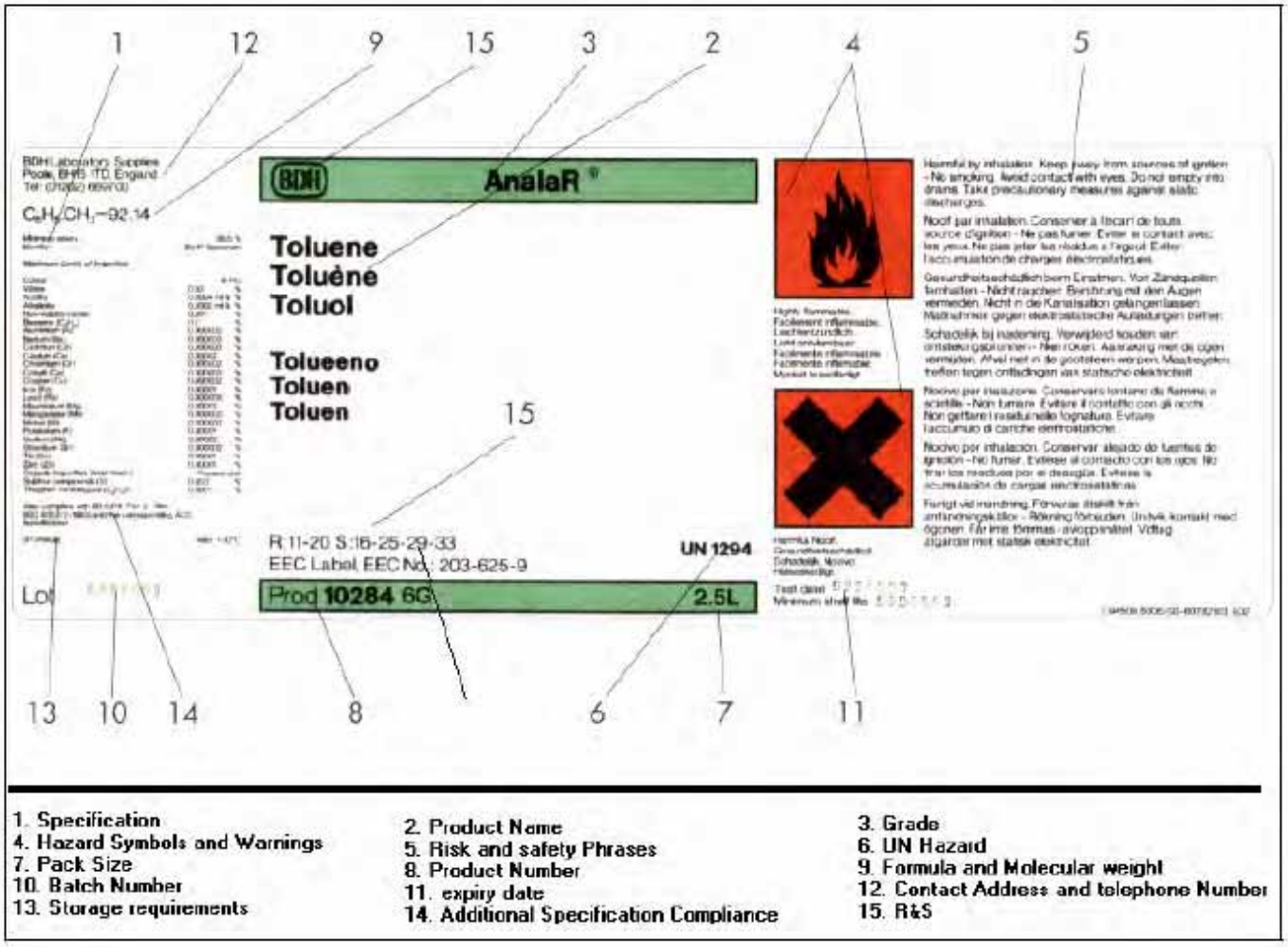
Figures shown in the bracket: Above risk number. (***C***) Corrosive to the skin, (***P***) indicates poison.

Points to Note on Handling

- *These liquids must be stored in acid-proof container away from fire and direct sunlight. Care must be taken that they do not come into contact with combustibles, organic substances or water.*
- *Protection: Rubber gloves must be worn when handling concentrated solutions and a mask as well if gas may be generated.*
- *Fire extinguishing method: Usually a large volume of water is used, but care must be taken not to scatter the solution.*

2.7 Reagent Appendix

2.7.1 Explanation of the Chemical Bottles Label



1. Specification
2. Product Name
3. Grade
4. Hazard Symbols and Warnings
5. Risk and safety Phrases
6. UN Hazard
7. Pack Size
8. Product Number
9. Formula and Molecular weight
10. Batch Number
11. expiry date
12. Contact Address and telephone Number
13. Storage requirements
14. Additional Specification Compliance
15. R&S

2.7.2 Explanation of the Hazardous Label on Reagents

2.7.3 Reagents Record

Table 2 Operation and Maintenance (O/M) Record of Reagents in _____ DFEA

الجدول -2- سجل استخدام وحفظ الكواشف في مديرية

1/14/2006

	Name of Reagent	Usage	Unit	Number	Purchased Date	Expiration date	Existence of Toxicity	Maker	Supplier	Stored Number in the end of Mar.	Stored Number in the end of Jun.	Stored Number in the end of Sep.	Stored Number in the end of Dec.	Remarks (recorder's name etc.)
	اسم الكاشف	استخدامه	الوحدة	العدد	تاريخ الشراء	تاريخ انتهاء الصلاحية	وجود مواد سامة	المصنع	المورد	الكمية المتبقية حتى نهاية شهر آذار	الكمية المتبقية حتى نهاية شهر حزيران	الكمية المتبقية حتى نهاية شهر أيلول	الكمية المتبقية حتى نهاية شهر كانون الأول	ملاحظات (اسم المسجل ... الخ)
1	pH standards, pH 4.01	pH calibration	500 ml	2	2005 Jun.		NO	HACH	MIMOSA					
	pH standards, pH 7.00		500 ml	2										
	pH standards, pH 10.00		500 ml	2										
2	Conductivity standards 180 µs/cm	EC&TDS calibration	100ml	1	2005 Jun.		NO	HACH	MIMOSA					
	Conductivity standards 1,000 µs/cm		100ml	1										
	Conductivity standards 18,000 µs/cm		100ml	1										
3	Turbidity Standards Kit for 2100 P Turbidity Meter (0.1, 20, 100, 800 NTU)	Turbidity calibration	500 ml for each	1	2005 Jun.		NO	HACH	MIMOSA					
4	Reagents (High range 0-1,500 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK	31	2005 Jun.		Yes	HACH	MIMOSA					
5	Reagents for NO_3^--N (High range, 0-30.0 mg/l)	NO_3^--N	100 tests/PK	8	2005 Jun.		Yes	HACH	MIMOSA					
6	Reagents for PO_4^{3-}(High range, 0-30.00 mg/l)	PO_4^{3-}	100 tests/PK	8	2005 Jun.		NO	HACH	MIMOSA					
7	Reagents for Cl⁻ (0-10,000 mg/l)	Cl⁻	100 tests/set	8	2005 Jun.		Yes	HACH	MIMOSA					
8	Reagents for Ammonia-N	NH_3-N	50 tubes/PK	15	2005 Jun.		Yes	HACH	MIMOSA					
9	Nitrification Inhibitor	BOD	500g	1	2005 Jun.		NO	HACH	MIMOSA					
10	BOD Nutrient Buffer Pillows	BOD	50 pillows/PK	15	2005 Jun.		NO	HACH	MIMOSA					
11	BOD Seed Inoculum	BOD	50 capsules/bottle	7	2005 Jun.		NO	HACH	MIMOSA					
12	NaOH Pack	BOD	1000g/PK	1	2005 Jun.		NO	-	MIMOSA					
13	Reagents (Low range 0-150 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK					HACH	MIMOSA					
14	Reagents for NO_3^--N (Mid range, 0-5.0 mg/l)	NO_3^--N	100 tests/PK					HACH	MIMOSA					
15	Reagents for PO_4^{3-}(Low range, 0-2.50 mg/l)	PO_4^{3-}	100 tests/PK					HACH	MIMOSA					
								HACH	MIMOSA					
16	COD standard, 300 mg/l	Check COD	200 ml					HACH	MIMOSA					
17	COD standard, 1000 mg/l	Check COD	200 ml					HACH	MIMOSA					
18	NO_3^--N standard, 1.0 mg/l	Check NO_3-N	500 ml					HACH	MIMOSA					
19	NO_3^--N standard, 10.0 mg/l	Check NO_3-N	500 ml					HACH	MIMOSA					
20	NO_3^--N standard, 100 mg/l	Check NO_3-N	500 ml					HACH	MIMOSA					
21	PO_4^{3-} standard, 50 mg/l	Check PO_4^{3-}	500 ml					HACH	MIMOSA					
22	NH_3-N standard, 10 mg/l	Check NH_3-N	500 ml					HACH	MIMOSA					
23	NH_3-N standard, 50 mg/l	Check NH_3-N	10 ml/16 Voluette Amples					HACH	MIMOSA					
24	BOD standard, 300 mg/l	Check BOD	10 ml/16 Voluette Amples					HACH	MIMOSA					
25	BOD standard, 3000 mg/l	Check BOD	10 ml/16 Voluette Amples					HACH	MIMOSA					

3 MAINTENANCE AND MANAGEMET OF EQUIPMENT

3.1 Maintenance and Management of Equipment

3.1.1 Air Conditioner

Temperature and humidity are two of the most important factors in carrying out work comfortably, efficiently, and accurately. In other word, equipment must be used within the temperature and humidity ranges stipulated for their basic specifications to ensure accuracy.

On the other hand, the feeling temperature is an important factor for analysts to work comfortably even though it differs from country to country.

3.1.2 Ventilation System

Ventilation system such as draft chamber or hood are indispensable for laboratories where large volumes of organic solvents are handled, although this depends on the chemical substances handled, and local suction for limited parts of the analysis room is also required. In cases where larger ventilation volume is required, extra air supply devices are necessary in addition to the louver installed at the door, etc.

When considering environment pollution from analysis facilities, gas exhaust from draft chamber and hood may be a problem. Gases and fumes such as hydrochloric acid, nitric acid, sulfuric acid and perchloric acid are contained in waste gases generated from the analysis room due to decomposition of samples. In same cases, poisonous gases such as sulfur dioxide, chlorine, hydrogen sulfide and hydrogen cyanide are contained. In such event, as scrubber that can spray alkaline solution is installed to purify and discharge the waste gases. Gas containing organic substances should be treated with activated carbon filters before discharge.

3.1.3 Electrical Equipment

Voltages used generally differ from country to country, and appropriate voltage should be supplied to each analytical instrument as the type different on the country where it is made. Constant voltage and frequency are required for some instruments, so exclusive lines should be equipped in such cases.

Some instruments required a long time to recover operational failure or damage to the instruments after its use is suspended due to a power supply interruption. In-house generator is indispensable for such equipment, and backup batteries are required for equipment with time lag problems to cover the period until in-house generator is activated.

3.2 Instrument Maintenance and Management

Instruments maintenance/management is one of the most important factors to ensure analysis accuracy. Appropriate maintenance/management of instruments must be carried out regularly to maintain the stability of the determination limit of the instruments. Each analyst must be designated as the responsible person for the instruments of which he/she has the special knowledge necessary to regular carry out their maintenance.

3.2.1 Maintenance of Instruments under Normal Status

The performance of instruments must be fully understood if it is to sufficiently make use of their capabilities. A manual attached to the instrument, often called the bible for the instrument, describes an outline of the device, its installation, basic operation, use of recoding media such as workstations, maintenance and troubleshooting methods, etc. In particular, the responsible person of each instrument should fully understand the details in the manual and regularly carry out maintenance/ management so that accurate measurement can always be done. The manual should be kept near the instrument and it should be available for reference at all times by anyone using the device. It is also recommended to show the emergency contact numbers of agencies, service center and engineers to ensure quick contact in case of trouble.

1. Daily Inspection

   When samples are measured with instruments, first check that the instrument is being operated correctly.

   Manuals for the daily checkup are compiled for equipment as a standard operation guide, and its detail results should be recorded.

2. Periodical Inspections

   In order to make fully use of the performance of the instrument, consumable parts should be replaced periodically and complicated adjustments that take a long time and can not be done regularly should be carried out periodical inspection. Depending on the work details, it is recommended to entrust such tasks to the manufacturer’s own engineers. Request the manufacturer to carry out check once or twice a year according to the schedule, although this interval can be adjusted depending on how frequently the instruments are operated. Checkup/maintenance results data that are submitted in report form by the manufacture should be retained with the daily checkup records.

3.2.2 Equipment Management under Abnormal Status

1. Power Supply Interruption

Use of high performance instrument is difficult in areas where power is often cut or voltage fluctuates significantly. In case the power is unexpectedly cut, an in-house electricity generator is required for instruments that must operate continuously.

Also the mains switch for equipment that is not backed up with emergency power supply such as in-house electricity generator should be turned off in case of power supply interruption. Startup operation should be carried out again after power is re-supplied, then the equipment should be checked to ensure it is functioning correctly and finally measurements should be carried out.

2 Water Supply Suspensions

In the event that the water supply is cut off, firstly, switches for heaters should be turned off and the main stopcock for the water supply closed. Turn off the main switch to any water-cooled equipment as well and suspend experiments. After the water is re-supplied, firstly open cocks that are not connected to the equipment and check that no air or dirty water remains. If air or dirty water comes out, keep the cocks open until the water runs clean, and then open the cocks connected to the equipment.

3.2.3 Management of Spare Parts and Consumable

Spare parts often used for normal operation that may suddenly break should be kept in storage. It is also important to regularly prepare consumables parts such as batteries. The storage of spare parts should be clearly indicated and they should be replenished without delay after usage.

3.3 Maintenance Appendix

3.3.1 Maintenance Record

Table 1 Operation and Maintenance (O/M) Record of Equipment in_____DFEA

الجدول -1- سجل تشغيل و صيانة التجهيزات لمديرية

1/13/2006

	Name of Equipment	Usage	Number	Maker	Supplier	Purchased Date	Trouble Contents and Date	Repair Record (constants and date)	Remarks (recorder's name etc.)
	اسم الجهاز :	استخدامه :	العدد	المصنع	المورد	تاريخ الشراء	نوع المشكلة و تاريخها	سجل التصليح (التفاصيل و التاريخ)	ملاحظات (اسم المسجل ..الخ)
1	Portable Colorimeter Kit (CEL 890)	SS, Color, NO_3^--N, PO_4^{3-}, NH_3-N,	1	HACH	MIMOSA	2005 Jun.	1)	1)	
2	Portable pH and Temp. Meter (sensION 1)	pH, Temp.	1	HACH	MIMOSA	2005 Jun.	1)	1)	
3	Portable EC and TDS Meter (sensION 5)	EC, TDS	1	HACH	MIMOSA	2005 Jun.	1)	1)	
4	Portable DO Meter (sensION 6)	DO	1	HACH	MIMOSA	2005 Jun.	1)	1)	
5	Portable Turbidity Meter (2100P)	Turbidity	1	HACH	MIMOSA	2005 Jun.	1)	1)	
6	COD Reactor (DRB 200-1)	COD_{Cr}	1	HACH	MIMOSA	2005 Jun.	1)	1)	
7	Digital Titrator (16900)	Cl	1	HACH	MIMOSA	2005 Jun.	1)	1)	
8	Stirring platform for BOD Analysis (OxiTop IS12)	BOD	2	WTW	MIMOSA	2005 Jun.	1)	1)	
9	BOD bottle with OxiTop measuring head	BOD	24	WTW	MIMOSA	2005 Jun.	1)	1)	
10	Incubator (TS 606/2i)	BOD	1	WTW	MIMOSA	2005 Jun.	1)	1)	
11	Analytical Balance (CP124S)	Reagents preparation	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
12	Table for Balance (YWT03)	For balance	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
13	Pure Water Unit (2001/4)	All of Parameters	1	GFL	MIMOSA	2005 Jun.	1)	1)	
14	Desktop Computer (for 14 DFEAs)	Data Analysis and Reporting etc.	1	Midi Tech	CMAX	2005 Jun.	1)	1)	
15	Printer	Reporting etc.	1	Hewlett-Packard	CMAX	2005 Jun.	1)	1)	
16	Digital Camera	Sampling Record and Reporting	1	Kodak CX7330	CMAX	2005 Jun.	1)	1)	

3.3.2 Detailed Service Report

Service Record of the Equipment In _____DFEA

From _____ to_____

Name of the Staff in Charge	TEL	Remarks

Instrument	Producer	Agency	Model	Serial Number	Date Installed

Malfunction		Solution		Operator	Further Information
Date	Description	Date	Repair		

Note: This form can be used in the future to record all of the events done on the instruments

4 LABORATORY WASTE TREATMENT

4.1 Various Kinds of Waste Discharged from Laboratory

III. Laboratory Waste Container Management

The **management of laboratory waste** containers are the first step in assuring proper disposal of hazardous waste. Proper labelling, storage and timely removal of these containers is critical to the safe and healthy conduct of laboratory work and compliance with government regulations. The criteria for these activities are the responsibility of the laboratory workers and are described in **Procedure 5**.

NH3-N 廃液 p H 調整

輸送の時 Labeling + Plastic Bag Covering

1. Harmful and dangerous substances are regularly used in laboratories.
2. Everything used in laboratories, such as broken glass tools, remains of experimental samples after analysis, concentrated waste water including reagents for experiments, dangerous substances, reagent bottles, unused samples and filter paper, etc. will be waste.
3. Concentrated waste water liquid must be disposed of separately. Each type of waste liquid should be stored in the specified containers. It is recommended to prepare a waste liquid management notebook to record use history per container to prevent handling mistakes.
4. The various types of waste discharged from laboratories should be roughly classified per disposal type and each of them stored in exclusive containers.

4.2 Proper Disposal of Laboratory Waste

1. What is the best way to dispose of laboratory waste? That means, i.e. self-disposal, entrusted disposal or storage, must be decided upon beforehand.
2. Where and what kind of treatment is carried out on effluent from analysis rooms and where is it to be discharged?
3. Is the effluent treatment sufficient or does not it cause any environmental pollution? Is a waste liquid treatment system installed at the laboratory? Is an effluent treatment facility suitable for heavy metal effluent installed? Is general effluent treatment also carried out?
4. If such disposal is entrusted to the outside, what kind of disposal methods are used, are such disposal surely executed, is the treatment certified and will not it cause any environmental pollution in the future?

4.3 Collection and Disposal of Waste Liquid

Concentrated “laboratory waste liquids” that include harmful substances that are released as a result of chemical analysis can be roughly classified into organic waste liquids containing general heavy metals, mercury, cyanides, fluorides, etc. and organic waste liquid containing combustible solvents, halogen solvents, etc.

Waste liquids should preferably be treated individually by the person who discharge them and who is therefore familiar with their contents and characteristics. However, when the liquids are to be treated at a central disposal, they must be collected and stored in the classified blocks and be marked to distinguish them in order to make treatment easier later.

An appropriate classification for collection is established based on the types of harmful substances resulting from the various activities of each laboratory and the treatment methods applicable to these substances. The Table below gives examples of the typical types of waste liquids and the treatment methods used.

Types and Treatment Methods of Waste Liquids from Laboratories

Classification	Details	Treatment method
(1).Heavy metals	Liquids that contain Pb, As, Cu, Fe, Mn, and other heavy metals.	After neutralization, the liquids undergo solid-liquid separation treatment using methods such as coagulation precipitation, and then the supernatant liquid is discharged. The sludge is treated separately.
(2).Mercury	Hg compounds (except for metal Hg).	Sulfide precipitation method, mercury-specific chelate resin absorption method etc.
(3).Chromium	Cr (III), Cr (VI).	Make it below pH3, then through reduction be ferrous or sulfurous acid make trivalent chromium. After neutralization conduct coagulation precipitation.
(4).Cyanides	Waste water containing CN compounds.	Do not mix with acidic waste water. Make it above pH10, use oxidative

Classification	Details	Treatment method
		decomposition treatment by sodium hypochlorite. Waste liquids containing heavy metals undergo treatment 1 .
(5).Acids/Alkalis	Liquids containing acids/alkalis.	After neutralization, discharge. Waste Liquids containing heavy metals undergo treatment1.
(6).Organic compounds	Pollutants containing organic substances.	Incineration disposal at special treatment facilities.
(7).Organic solvents	Waste organic solvents	Collect as much as possible through distillation for reuse. Alternatively, incineration disposal at special treatment facilities.

4.4 Treatment Appendix

4.4.1 Waste Record

Wastes Record In _____DFEA

From	To	Tank Number	For Analyses	Added Materials	Countermeasure	Disposal (Yes/No)	Sign of the Responsible

5 PROPER ATTITUDE TO ACCURATE ANALYSIS

5.1 Overall Background to the Environmental Analysis

Analysts must make effort to understand the overall background of the analysis. Regularly striving to understand the overall background is important to ensure precision and reliability of analysis data. Below you can find some questions that always should be kept in mind:

1. Why and by whom is the analysis carried out? What Kinds of parameters need to be analyzed?
2. What should the analysis data be compared with?
3. When, where and by whom will the samples be collected?
4. How should the samples be collected, and when should they be delivered? How many samples and how much are to be collected? Who will prepare the collection of tools and containers for sampling?
5. What kinds of analysis methods are to be used?
6. In analysis possible? Who will carry out the analysis? Are the analytical instruments functioning correctly?
7. Are tools and chemical required for analysis ready? Are the analytical instruments prepared?
8. When can the analysis be completed?
9. Can samples be reserved?
10. Can the analysis room be managed?
11. Analysts must carry out their analytical work while fully recognizing each person’s area of responsibility.

5.2 Clearing up and Tidying of the Laboratory

5.2.1 Points to Note on Safe Operation in Laboratory

1. Clearing up and tidying of the room.
   - The room should be cleaned regularly.
   - Instrument workbench and laboratory table should be clean and tidy.
2. Laboratory uniform should not easily burn and disturb analysts in their operation.
   - Ventilation should function adequately.
   - Fire extinguishers and emergency exits should be maintained.
3. No one other than the people concerned should be able to enter the room.

4. Operational meetings should be held amongst analysts to ensure safe operation.
5. Confirm who is to manage the room key and who is responsible for the room management.

5.2.2 Cleaning of the Laboratory for Correct Analysis Data

1. Laboratory table must be cleaned by the user prior to starting analysis to prevent polluting samples with dust or other contaminants.
2. Greater care must be taken with cleaning after handling high concentration analysis samples.

5.2.3 Classification of Laboratory Table

Laboratory tables are classified in accordance with the analysis parameter.

1. It is important not to touch laboratory table handled by others unless there is a risk of fire or explosion.
2. Ensure that chemical and samples are not left on laboratory table.
3. Exchange information on progress status of analysis between analysts.

5.2.4 Management of Preserved Samples

1. Only samples required for the experiment are brought to the laboratory table.
2. Labels indicating the parameters and collection date, etc. must be attached to the samples. Samples of same kind should be kept together in a box and stored.
3. If samples are stored in refrigerators , care must be taken to clearly separate them from other samples during storage.

5.2 Sampling

5.3.1 Sample Collection, Preserving and Storage

Correct sampling and storage are critical for accurate testing. For greatest accuracy, thorough clean sampling devices and containers to prevent carryover form pervious samples. Preserve the sample properly.

Preservation slows the chemical and biological changes that continue after collection. These processes may change the amount of chemical species available for analysis. Normally, analyze the samples as soon as possible after collection, especially when the analyze concentration is expected to be low.

5.3.2 Collecting Water Samples

Collect samples near the center of the vessel or duct and below surface. Use clean containers. Rinse the container several times first with the water of the sample.

5.3.3 Correcting for Volume Additions

If you use a large volume of preservative, correct for the volume of the preservation added. This accounts for dilution due the acid added to the sample and the base used to adjust the pH range of the procedure. This correction is made as follows:

1. Determine the volume of initial sample, the volume of acid and base added, and the total or final volume of the sample.
2. Divide the total volume by the initial volume of sample.

Multiply the test result by this factor.

5.3.4 Sample Filtration

Filtering separates particles from the aqueous sample. Filtration uses a medium, usually filter paper, to retain particles but pass solution. This is especially helpful when sample turbidity interferes with analysis. Two general methods of filtration are gravity and vacuum. Gravity filtration uses gravity to pull the sample though the filter paper. Vacuum filtration uses suction and gravity to move the sample through the filter.

5.4 Analysis

5.4.1 Temperature Considerations

For best results, perform most tests with sample temperature between 20 C and 25 C.

5.4.2 Using Equipments and Tools

You should aware how to use each equipment and practice using them before analysis. You can make self test by analyzing tap water, or mineral water.

5.4.3 Mixing Water Sample

Mixing samples is very important to get real results. Shake the containers before taking samples form them, and mix the samples during analysis when it is required.

5.5 Interferences

Substances in the sample may interfere with a measurement. You should try to remove the interferences as much as possible.

If you get an unusual answer, a color that you do not expect, or you notice an unusual color or turbidity, the result may be wrong. Repeat the test on a sample diluted with demonized water. Compare the result with the result of the original test. If these two are not close, the original result may be wrong and you should make an additional dilution to check the second test (first dilution). Repeat this procedure until you get the same result twice in a row.

That was the first step to resolve interference problems. The second step is to find out the interfered substances and try to eliminate them.

5.6 Method Performance

5.6.1 Estimated Detection Limit

Ranges for chemical measurements have limits. The lower limit is important because it determines whether a measurement is different from zero.

5.6.2 Reagent Blank Correction

The Reagent Black Correction subtracts the color absorbed when running the test with demonized water instead of sample. The Black value is subtracted from every result to correct for any background color due to reagents.

5.6.3 Standard Adjust

It is very important to check and calibrate the instruments. In order to prevent any errors during analysis, you should check periodically the work by running the tests on standard solutions and calculate the standard deviation.

6. OTHERS

6.1 Standard Operation Procedure (SOP)

It is important for analysts to systematically understand the standard operation procedure per analysis method and execute analysis in accordance with the manual.

It is important to try to give descriptions in plain and simple terms that can be understood by all analysts when drawing up a manual. Compiled manuals should be placed where they can easily be used by all staffs in the laboratory.

6.2 Management of Analysis Records

It is important to record and perverse processes to the final report based the raw data that has been analyzed in accordance with standard operation procedure.

Measurements conditions for instrumental analysis, analysis charts and record data printed out from data processing system should be saved in the appropriate files, and they should be managed and kept somewhere that anyone can use at any time.

6.3 Handling of Analysis Data

6.3.1 Significant Figure

It is important to understand how many digits for significant figures should be calculated when handling analysis data.

6.3.2 Anomalous Value

If experiments are not carried out in accordance with the analysis manual, the measured values must be selected carefully with technological consideration. If a technological problem is deemed to exist, as a general rule, the measurement values must not be used regardless of whether or not the values are anomalous.

It is important to carefully consider anomalous values for experiments that are held in line with the analysis manual. Average values for each analysis room and the range within the analysis rooms, etc. can be considered, but refer to the concerned books for details.

General points that are considered to be causes of anomalous values are described as follows:

1. Caused by calculation mistakes. Extra care must be taken when using spreadsheet software.
2. Determination limit is not considered.

6.3.3 Accuracy Management

Samples of specified concentration that are available or sold on the market should be used by analysts themselves to control their analysis accuracy.

The organization analyze the uniformly prepared samples in accordance with the measurement and analysis guidelines as well as recording the pretreatment conditions and service condition of analytical instruments and other apparatuses.

1. Round Robin Test
   This means a joint test carried out in rotation. This is a joint experiment method that is used to determine the reliability of the test data, the testers' technical capability, or content values of sample/ test pieces to be use as the standard. One test piece or sample is circulated and measured and checked by each of the members.

2. Intra-Laboratory Accuracy
   This indicates measurement accuracy in cases where the same sample is repeatedly analyzed by the same organization.

3. Inter-Laboratory Accuracy
   This indicates the measurement accuracy in case where the same sample is analyzed by a number of organizations. This work is generally called cross-checking or inter-laboratory comparison study and is a necessary process to check preciseness, accuracy, consistency with reference samples, and identify other problems when the concerned method is actually used.

6.4 Introduction of ISO System and Laboratory Certification

ISO 17025 is an international standard covering capability of testing laboratory. The 17025 was originally issued a the ISO/IEC guide 25 in 1978, which was updated to its 1999version standard and thus dates back further than ISO 9000. Whereas the requirements of ISO 9000 use general descriptions applicable to any type manufacturing industry-based business, the 17025 uses descriptions targeted at testing laboratories (calibration laboratories), so it is easy for

laboratory staffs to understand. It can be said that what is characteristic for the 17025 is that more technical requirements are added to requirements of quality systems equivalent to the 9000.

However, the 17025 certifies that one has the ability to implement the specified test methods and does not give qualification to the entire laboratory.

The following nine items are the technical requirements to manage and guarantee data quality:

1. Personnel.
2. Facilities and environmental conditions
3. Test methods and validation of the methods
4. Equipment
5. Traceability
6. Sampling
7. Handling of test items (samples)
8. Quality Assurance of test result
9. Reporting of the results

7. APPENDIX

7.1 Name List of the Staff in Charge of Laboratory Management

Table 3 Name List of The Staff in Charge of Laboratory Management

الجدول -3- قائمة بأسماء الكادر المسؤول عن إدارة المخبر

Item البند	Name of The Staff in Charge اسم الشخص المسؤول	TEL رقم الهاتف	Remarks ملاحظات
Laboratory Safety (Electricity, Fire Prevention, laboratory occupation Health and Safety سلامة المخبر (الكهرباء ,تجنب الحريق, الصحة و السلامة المهنية في المخبر)			
Management of Equipment and Spare Parts إدارة التجهيزات و قطع الغيار			
Management of Reagents and Glassware إدارة الكواشف و الزجاجيات			
Treatment of Liquid and Solid Wastes معاجة المخلفات الصلبة و السائلة			

7.2 Suppliers List

Table 4 Suppliers List

الجدول -4- قائمة المورّد

Supplier		Name of The Staff in Charge	Address	TEL	FAX	E-mail	Remarks
المورّد		اسم الشخص المسؤول	العنوان	الهاتف	الفاكس	البريد الالكتروني	
MIMOSA	Agency of HACH equipment and reagents	Mr. Sami BAZ	Damascus - Abou Roummaneh Shakib Arslan St. - Masri Bldg. Next to Swedish Embassy, P.O.Box 5098	011-333-3276	011-333-2290	mimosa@net.sy	
ALBA Instruments & Chemicals	Supplier for glassware etc.	Eng. Antoun Doummar	Azbakieh, Damascus, P.O.Box 8345	011-442-6689	011-441-0305	antoundoummar@mail.sy	
CMAX	Desktop computer, printer and digital camera	Mr. Talal Al Habal		011-666-3955	011-666-3988		

Children in Laboratories

3.2 Children at MTU

Policy: It is the policy of Michigan Technological University that children under the age of 12 are not permitted in work areas (e.g., offices, classrooms, shops), except those spaces specifically intended for public use, without the written permission of the department chair or director. Children under the age of 12 who are not enrolled in a Michigan Tech class or program are not permitted in laboratories at any time. Children under the age of 16 must be under the direct supervision of the laboratory supervisor while visiting or participating in MTU sponsored activities in laboratories containing hazardous chemicals or equipment.

Additional Information: It is the intent of this policy that the department chair or director will verify that a student or employee has a workable plan to provide age-appropriate supervision and protection from foreseeable safety and health hazards before allowing a child to be brought into a campus work area. Children must not be allowed to roam the building unsupervised. Permission may not be given for a child under 12 to enter a laboratory or other area with hazardous substances, machinery or tools except as part of an organized event where special provisions have been made to prevent exposure to these hazards.

Table 1 Operation and Maintenance (O/M) Record of Equipment in_____DFEA

الجدول -1- سجل تشغيل و صيانة التجهيزات لمديرية

2006/1/13

Name of Equipment		Usage	Number	Maker	Supplier	Purchased Date	Trouble Contents and Date	Repair Record (constants and date)	Remarks (recorder's name etc.)
اسم الجهاز :		استخدامه :	العدد	المصنع	المورّد	تاريخ الشراء	نوع المشكلة و تاريخها	سجل التصليح (التفاصيل و التاريخ)	ملاحظات (اسم المسجّل ..الخ)
1	Portable Colorimeter Kit (CEL/890)	SS, Color, NO_3^--N, PO_4^{3-}, NH_3-N,	1	HACH	MIMOSA	2005 Jun.	1)	1)	
2	Portable pH and Temp. Meter (sensION 1)	pH, Temp.	1	HACH	MIMOSA	2005 Jun.	1)	1)	
3	Portable EC and TDS Meter (sensION 5)	EC, TDS	1	HACH	MIMOSA	2005 Jun.	1)	1)	
4	Portable DO Meter (sensION 6)	DO	1	HACH	MIMOSA	2005 Jun.	1)	1)	
5	Portable Turbidity Meter (2100P)	Turbidity	1	HACH	MIMOSA	2005 Jun.	1)	1)	
6	COD Reactor (DRB 200-1)	COD_{Cr}	1	HACH	MIMOSA	2005 Jun.	1) Temperature can not reach 150^{0}C. (10th Dec. 2005) 2)	1) The reactor was sent to MIMOSA on 28th Dec. 2005., and heating system was changed. On 24 th Jan. 2006, DFEA receives the reparired reactor. 2)	Mr. …….
7	Digital Titrator (16900)	Cl^-	1	HACH	MIMOSA	2005 Jun.	1)	1)	
8	Stirring platform for BOD Analysis (OxiTop IS12)	BOD	2	WTW	MIMOSA	2005 Jun.	1)	1)	
9	BOD bottle with OxiTop measuring head	BOD	24	WTW	MIMOSA	2005 Jun.	1)	1)	
10	Incubator (TS 606/2i)	BOD	1	WTW	MIMOSA	2005 Jun.	1)	1)	
11	Analytical Balance (CP324S)	Reagents preparation	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
12	Table for Balance (YWT03)	For balance	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
13	Pure Water Unit (2001/4)	All of Parameters	1	GFL	MIMOSA	2005 Jun.	1)	1)	
14	Desktop Computer (for 14 DFEAs)	Data Analysis and Reporting etc.	1	Mall Tech	CMAX	2005 Jun.	1)	1)	
15	Printer	Reporting etc.	1	Hewlett-Packard	CMAX	2005 Jun.	1)	1)	
16	Digital Camera	Sampling Record and Reporting	1	Kodak CX7330	CMAX	2005 Jun.	1)	1)	

Table 2 Operation and Maintenance (O/M) Record of Reagents in_____DFEA (Maker of reagents: HACH; Supplier: MIMOSA)

الجدول -2- سجل استخدام وحفظ الكواشف في مديرية

2006/6/17

	Name of Reagent اسم الكاشف	Usage استخدامه	Unit الوحدة	Number العدد	Purchased Date تاريخ الشراء	Expiration date تاريخ انتهاء الصلاحية	Existence of Toxicity وجود مواد سامة	Order No.	Stored no. in the end of Mar. الكمية المتبقية حتى نهاية شهر آذار	Stored no. in the end of Jun. الكمية المتبقية حتى نهاية شهر حزيران	Stored no. in the end of Sep. الكمية المتبقية حتى نهاية شهر أيلول	Stored no. in the end of Dec. الكمية المتبقية حتى نهاية شهر كانون الأول	Remarks (recorder's name) ملاحظات (اسم المسجّل ... الخ)
1	pH standards, pH 4.01	pH calibration	500 ml	2	2005 Jun.		NO	HACH 22834-49					
	pH standards, pH 7.00		500 ml	2				HACH 22835-49					
	pH standards, pH 10.00		500 ml	2				HACH 22836-49					
2	Conductivity standards, 180 µs/cm	EC&TDS calibration	100ml	1	2005 Jun.		NO	HACH 23075-42					
	Conductivity standards, 1,000 µs/cm		100ml	1				HACH 14400-42					
	Conductivity standards, 18,000 µs/cm		100ml	1				HACH 23074-42					
3	Turbidity Standards Kit for 2100 P Turbidity Meter (0.1, 20, 100, 800 NTU)	Turbidity calibration	500 ml for each	1	2005 Jun.		NO	HACH 26594-00					
4	Reagents (High range 0-1,500 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK	31	2005 Jun.		Yes (Hg, Ag, Cr)	HACH 21259-25					
5	Reagents for NO_3^--N (High range, 0-30.0 mg/l)	NO_3^--N	100 tests/PK	8	2005 Jun.		Yes (Cd)	HACH 21061-69					
6	Reagents for PO_4^{3-}(High range, 0-30.00 mg/l)	PO_4^{3-}	100 tests/PK	8	2005 Jun.		NO	HACH 2236-32, 1934-32					
7	Reagents for Cl^- (0-10,000 mg/l)	Cl^-	100 tests/set	8	2005 Jun.		Yes (Ag)	HACH 14397-01					
8	Reagents for NH_3-N (High range, 0-50 mg/l)	NH_3-N	50 tests/PK	15	2005 Jun.		Yes (CN^-)	HACH 26069-45					
9	Nitrification Inhibitor	BOD	500g	1	2005 Jun.		NO	HACH 2533-34					
10	BOD Nutrient Buffer Pillows	BOD	50 pillows/PK	15	2005 Jun.		NO	HACH 14160-66					
11	BOD Seed Inoculum	BOD	50 capsules/bottle	7	2005 Jun.		NO	HACH 24712-00					
12	NaOH Pack	BOD	1000g/PK	1	2005 Jun.		NO	Bobel-Sweden					
13	Reagents (Low range 0-150 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK	2	2006 Jun.		Yes (Hg, Ag, Cr)	HACH 21258-25					
14	Reagents for NO_3^--N (Mid range, 0-5.0 mg/l)	NO_3^--N	100 tests/PK	1	2006 Jun.		Yes (Cd)	HACH 21061-69					
15	Reagents for PO_4^{3-}(Low range, 0-2.50 mg/l)	PO_4^{3-}	100 tests/PK	1	2006 Jun.		NO	HACH 21060-69					
16	Reagents for NH_3-N (low range, 0-2.50 mg/l)	NH_3-N	50 tests/PK	1	2006 Jun.		Yes (CN^-)	HACH 26045-45					
17	COD standard, 300 mg/l	Check COD	200 ml	1	2006 Jun.		NO	HACH 12186-29					
18	COD standard, 1000 mg/l	Check COD	200 ml	1	2006 Jun.		NO	HACH 22539-29					
19	NO_3^--N standard, 1.0 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 2046-49					
20	NO_3^--N standard, 10.0 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 307-49					
21	NO_3^--N standard, 100 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 1947-49					
22	PO_4^{3-}standard, 50 mg/l	Check PO_4^{3-}	500 ml	1	2006 Jun.		NO	HACH 171-49					
23	NH_3-N standard, 10 mg/l	Check NH_3-N	500 ml	1	2006 Jun.		NO	HACH 153-49					
24	NH_3-N standard, 50 mg/l	Check NH_3-N	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14791-10					
25	BOD standard, 300 mg/l	Check BOD	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14865-10					
26	BOD standard, 3000 mg/l	Check BOD	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14866-10					
27	Cl^- standard, 1000 mg/l	Check Cl^-	500 ml	1	2006 Jun.		NO	HACH 183-49					
28	Bromine Water 30g/L	NO_2 interfering (NO_3 testing)	29 mL	1	2006 Jun.		NO	HACH 2211-20					
29	Phenol Solution	NO_2 interfering (NO_3 testing)	29 mL	1	2006 Jun.		NO	HACH 2112-20					
30	Sulfamic acid	NO_2 interfering (PO_4 testing)	113 g	1	2006 Jun.		NO	HACH 2344-14					
31	Phosphate Pretreatment Powder Pillows	Turbidity and color interfering	100/pkg	1	2006 Jun.		NO	HACH 14501-99					
32	Hydrochloric Acid, ACS	pH adjusting (NH_3-N, PO_4 etc.)	500 mL	1	2006 Jun.		NO	HACH 134-49					
33	Sulfide Inhibitor Powder Pillows	S interfering (Cl^-, NH_3-N testing)	100/pkg	1	2006 Jun.		NO	HACH 2418-99					
34	Mercuric Sulfate	Cl^- interfering (COD testing)	28.3 g	1	2006 Jun.		Yes (Hg)	HACH 1915-20					
35	Hydrogen Peroxide, 30% ACS	Sulfite interfering (Cl- testing)	500 mL	1	2006 Jun.		NO	HACH 144-11					

Table 3 Name List of The Staff in Charge of Laboratory Management

الجدول -3- قائمة بأسماء الكادر المسؤول عن إدارة المخبر

Item البند	Name of The Staff in Charge اسم الشخص المسؤول	TEL رقم الهاتف	Remarks ملاحظات
Laboratory Safety (Electricity, Fire Prevention, laboratory occupation Health and Safety سلامة المخبر (الكهرباء ,تجنب الحريق, الصحة و السلامة المهنية في المخبر)			
Management of Equipment and Spare Parts إدارة التجهيزات و قطع الغيار			
Management of Reagents and Glassware إدارة الكواشف و الزجاجيات			
Treatment of Liquid and Solid Wastes معاجة المخلفات الصلبة و السائلة			

Table 4 Suppliers List

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MIMOSA	Agency of HACH equipment and reagents	Mr. Sami BAZ	Damascus - Abou Roummaneh Shakib Arslan St. - Masri Bldg. Next to Swedish Embassy, P.O.Box 5098	011-333-3276	011-333-2290	mimosa@net.sy	
ALBA Instruments & Chemicals	Supplier for glassware etc.	Eng. Antoun Doummar	Azbakieh, Damascus, P.O.Box 8345	011-442-6689	011-441-0305	antoundoummar@mail.sy	
CMAX	Desktop computer, printer and digital camera	Mr. Talal Al Habal		011-666-3955	011-666-3988		

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MIMOSA	Agency of HACH equipment and reagents	Mr. Sami BAZ	Damascus - Abou Roummaneh Shakib Arslan St. - Masri Bldg. Next to Swedish Embassy, P.O.Box 5098	011-333-3276	011-333-2290	mimosa@net.sy	
ALBA Instruments & Chemicals	Supplier for glassware etc.	Eng. Antoun Doummar	Azbakieh, Damascus, P.O.Box 8345	011-442-6689	011-441-0305	antoundoummar@mail.sy	
CMAX	Desktop computer, printer and digital camera	Mr. Talal Al Habal		011-666-3955	011-666-3988		

Table 5 Operation and Maintenance (O/M) Record for Sending Waste Liquid to DAM from_____DFEA (Basic Water Quality Alaysis)

جدول رقم 5 - سجل التشغيل و الصيانة
لإرسال المنصرفات السائلة إلى مديرية بيئة دمشق من مديرية بيئة ـــــــــــــ للتحاليل الأساسية لجودة المياه

No. of Containers عدد الحاويات _____

Volume of Each Container (L) حجم كل حاوية بالليتر _____

Total Quantity (L) الكمية الكلية بالليتر _____

Stored Period: فترة التخزين From من _____ Year سنة _____ Month شهر _____ Day يوم _____ To إلى _____ Year سنة _____ Month شهر _____ Day يوم _____

Waste for Analysis: منصرفات التحاليل

COD_{Cr} ☐	NO^{3-}-N ☐	Cl^- ☐	PO_4^{3-} ☐	NH_3-N ☐
Waste Contents: محتويات الصرف				
$HgSO_4$, $AgSO_4$,(Catalyst) $Cr_2(SO_4)_3$ (Cr^{3+}high range), Cr_2O_7, (Cr^{6+}low range)	Cd^{2+}, Sulfanilic Acid	$AgNO_3$, K_2CrO_4 (indicator)	Molybdate, Ascorbic Acid (low range) Molybdate, Amino Acid (high range)	Chlorine, Salicylate, Cyanurate, Cyanide (CN^-) (pH>10)

Other Items:
عناصر أخرى _____

Is there a "Hazardous Chemical Waste from _____DFEA" label on the containers? ☐
هل تم وضع لوحة "منصرفات كيميائية خطرة من مديرية بيئة ـــــــــ" على الحاويات

Remarks (Additional Information etc.)
ملاحظات : معلومات إضافية _____

Transporting Date to Damascus DFEA: تاريخ النقل إلى مديرية بيئة دمشق Year سنة _____ Month شهر _____ Day يوم _____

Name: الاسم _____ **Signature:** التوقيع _____

Check List
For
Record and Maintenance
Of
Equipment/Glassware/Reagents/Chemicals
For
Damascus DFEA

Check List for Operation and Maintenancein Damascus DFEA (Equipment/Instrument)

2007/11/25

Name of Equipment		Usage	Q'ty	Manufacture/Model	Supplier	Date of Purchase	Trouble Contents and Date	Repair Record (constants and date)	Remarks (recorder's name etc.)
1	UV/VIS spectrophotometer	Determination of concentration of PO43-, NH3-N, Surfactant, chromium in water	1	Hach	Mimosa	Mar-06			
2	Micro analysis balance	Weighing	1	BBC22, Boeco/Germany	Alba	May-06			
3	Balance (6kg)	Weighing	1	BBL71, Boeco/Germany	Alba	May-06			
4	Water Quality Analyzer (Meter for Electrode)	Measurement of pH, EC, NO3-, Cl-, F-, CN-	1	CyberScan PCD6500, Eutech Instruments	Alba	Apr-06			
5	Electrode for pH	Measurement of pH	1	Eutech Instruments	Alba	Mar-06			
6	Electrode for EC	Measurement of EC	1	Eutech Instruments	Alba	Mar-06			
7	Electrode for NO3-	Measurement of NO3-	1	Eutech Instruments	Alba	Mar-06			
8	Electrode for Cl-	Measurement of Cl-	1	Eutech Instruments	Alba	Mar-06			
9	Electrode for F-	Measurement of F-	1	Eutech Instruments	Alba	Mar-06			
10	Electrode for S2-	Measurement of S2-	1	Eutech Instruments	Alba	Mar-06			
11	Electrode for CN-	Measurement of CN-	1	Eutech Instruments	Alba	Mar-06			
12	Turbidimeter	Determination of turbidity	1	TB 1000 White light, Eutech Instruments	Alba	Mar-06			
13	Draft chamber with gas cleaning device	Lab. Ventilation	1	Advancelab, Singapore	Alba	Apr-06			

14	Refrigerator	Preservation of samples, etc.	1	Local	Alba	Apr-06			
15	Locker for reagent	Storage of reagents/chemicals	4	Local	Alba	Jan-06			
16	Water Purifier	Water supply	1	Ion Exchanger: TKA Germany, DI 425 Water Still: Hamilton, U.K.	Alba	Jan-06			
17	Ultrasonic cleaner	For cleaning of glasswears	1	ELMA, LC30	TBS	Jan-06			
18	Middle temperature oven	For drying of glassware	1	Selecta, Spain	Alba	Jan-06			
19	Muffle furnace	For heating	1	Hobersal, Spain	Alba	Jan-06			
20	Autoclave (vertical type)	Sterilization, Drying	1	pbi, Italy, Mini-Matic	Alba	Jan-06			
21	Centrifuge	Sample preparation	1	C-28, Boeco	Alba	Mar-06			
22	Shaker	For separation funnel	1	Orbital Multi-Shaker, PSU-20, Boeco	Alba	Mar-06			
23	Hot plate	Sample preparation	2	Local	Alba	Mar-06			
24	Multi magnetic stirrer	IKA, Ikamag RO 10 power	1	IKA, Ikamag RO 10 power	Alba	Mar-06			
25	Rotary evaporator	Sample preparation	1	IKA/Germany	Alba	Mar-06			
26	Constant temperature water bath	Digiterm-100, Selecta/Spain	1	Digiterm-100, Selecta/Spain	Alba	Jan-06			
27	Vacuum filtration unit	Sample preparation	1	Local	Alba	Jan-06			
28	Water sampler	Water sampling	1	Local	Alba	Mar-06			

29	Colony counter	Counting of bacteria colonies	1	Funke-Gerber, Germany, ColonyStar	Alba	Mar-06			
30	Oil content analyzer	Determination of oil content in water	1	OCMA-310/HORIBA	Mimosa	Mar-06			
31	Solvent recovery unit	For recovery of solvent	1	SR-300/HORIBA	Mimosa	Mar-06			
32	High temperature oven	Measurement of Total coliform	1	Selecta, Spain	Alba	Dec-06			
33	Heating Mantle with magnetic stirrer	Measurement of COD	2	India	MAN	Feb-06			

Name List of The Staff in Charge of Laboratory Managem

Item	Name of The Staff in Charge	TEL
Laboratory Safety (Electricity, Fire Prevention, laboratory occupation Health and Safety		
Management of Equipment and Spare Parts		
Management of Reagents and Glassware		
Treatment of Liquid and Solid Wastes		

ıent

(DAM DFEA)

Remarks

Suppliers List

Supplier		Name of The Staff in Charge	Address	TEL	FAX	E-mail	Remarks
MIMOSA	Agency of HACH equipment and reagents	Mr. Sami BAZ	Damascus - Abou Roummaneh Shakib Arslan St. - Masri Bldg. Next to Swedish Embassy, P.O.Box 5098	011-333-3276	011-333-2290	mimosa@net.sy	
ALBA Instruments & Chemicals	Supplier for glassware etc.	Eng. Antoun Doummar	Azbakieh, Damascus, P.O.Box 8345	011-442-6689	011-441-0305	antoundoummar@mail.sy	
MAN	Merck Agent/Reagents Chemicals	Mr. Abdul Hadi Tayyar	Jaber lbn Hayyan St., Damascus, Syria	TelFax: +963 11 4466061, Tel: +963 11 4427071, E-mail: man71sar@scs-net.org			
TBS	Supplier for glassware etc.	Mr. Maher Madi (Eng.) (General Manager), Mr. Ahmad Mohamad (General Manager)	Teliani, Al-Zahraa Street, Damascus, Syria	Tel: +963 11 3314408, Fax: +963 11 3341966, Cell: +963 93 613656, E-mail: ah-na@scs-net.org			

Maintenance record tables of glasswares (1)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Whole Pipettes	Glass, 1 ml	3								
		Glass, 2 ml	3								
		Glass, 5 ml	5	Aug. 6, 2006							
		Glass, 10 ml	5								
		Glass, 20 ml	3								
		Glass, 50 ml	2								
	Graduated pipettes	Glass, 1 ml	2								
		Glass, 5 ml	3								
		Glass, 10 ml	4								
	Pipette Fillers	Applicable pipette's capacity: not more than 2mL	1								
	(Rubber Pippeter)	Capacity: 25mL	2								
	Ceramic mortar	Size: 110-130mm	1								
	Beakers	50 ml, Glass, Color: clear	2								
		100 ml, Glass, Color: clear	10								
		250 ml, Glass, Color: clear	10								
		400 ml, Glass, Color: clear	2								
		600 ml, Glass, Color: clear	5								
		1000 ml, Glass, Color: clear	2								
		2000 ml, Glass, Color: clear	1								
	Volumetric Flasks	25 ml, Color: clear, joint and poly stopper	2								
		50 ml , Color: clear, joint and poly stopper	2								
		100 ml ,Color: clear, joint and poly stopper	10	Aug. 6, 2006							
		200 ml Color: clear, joint and poly stopper	2								
		500 ml , Color: clear, joint and poly stopper	2								
		1000 ml , Color: clear, joint and poly stopper	1								
	Erlenmeyer Flasks	100 ml, Borosilicate glass, color: clear	5								
		250 ml, Borosilicate glass, color: clear	5								
		300 ml, Borosilicate glass, color: clear	5								
		500 ml, Borosilicate glass, color: clear	2								
		1000 ml, Borosilicate glass, color: clear	1								
	Erlenmeyer Flasks with Ground Joints	100 ml, Borosilicate glass, color: clear	5								
		250 ml, Borosilicate glass, color: clear	5								
		300 ml, Borosilicate glass, color: clear	5								
		500 ml, Borosilicate glass, color: clear	2								
Check person											

Maintenance record tables of glasswares (2)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Graduated Cylinders	50 ml, Borosilicate glass, A B class, Color: clear	2								
		100 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		250 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		500 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		1000 ml, Borosilicate glass, ~~A~~ B class, Color: clear	1								
	Watch Dish	φ65-75mm	2	Aug. 6, 2006							
		φ90-100mm	2								
		φ125mm	2								
		φ150mm	2								
		φ180-200mm	2								
	Wash Bottles	Capacity: 500 ml, Polypropylene	3								
		Capacity: 1000 ml, Polypropylene	3								
	Beaker with handle	Capacity: 1000 ml, Polypropylene	1								
	Test Tube with stopper	Test tube, 18(dia.) x 180 (L) mm $16, 100 pcs/case	1	Aug. 6, 2006							
	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	1								
	Funnels	Soda-lime glass, Angle: 60°, with short stem, φ70 mm	5								
		Soda-lime glass, Angle: 60°, with short stem, φ100 mm	5								
	Glass rods	Glass rods, 750 (L) x 5(dia.)mm	2								
		Glass rods, 750 (L) x 8(dia.)mm	2								
	Glass tube	Glass tube, 750 (L) x φ6×φ8mm	2								
	Stoppcock	Stoppcok, φ6×φ8mm, Fluoroplastic (PTFE) or equivalent, Temperature resistant	1	Aug. 6, 2006							
	Pinchcok	Pinchcok (Size M), Stainless steel	5								
	Screw Cock	Screw Cock (Size M), Stainless steel	5								
	Stopwatch	Manual rolling	1								
	Micro pipet	2～20 μl	1								
		10～100 μl	1	Aug. 6, 2006							
	Chip for micro pipet	0.5～10 μl, 1000 pcs/package	1								
		2～200 μl, 1000 pcs/package	1								
	Thermometer	Mercury type cylinder shape thermometer, -20～100℃	2								
	Beaker tongs	Tongs for flask	1								
	Cork borer	Cork borer sets saw-shaped edge (No. of borers, 12)	1	Aug. 6, 2006							
	Muff	Clamp Holders, Horizontal stick	10								
	Jumbo muff	Clamp Holders, Horizontal stick	5								
Check person											

Maintenance record tables of glasswares (3)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Clamps	Open diameter: 5～50 mm	5								
		Open diameter: 5～80 mm	5								
	Tweezers	Odontology department tweezers	2	Aug. 6, 2006							
	Vacuum hose	Vacuum hose φ8×φ21mm (5 m/ Unit)	1								
	Rubber tube	Rubber tube φ6×φ9mm (10 m/ Unit)	1								
	Silicon rubber tube	Silicon rubber tube 'φ6×φ9mm, (10m/ Unit)	2								
	Silicon rubber tube	Silicon rubber tube 'φ8×φ10mm, (10m/ Unit)	1	Aug. 6, 2006							
	Tube joint	Straight, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
		T type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
		Y type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
	Support for test tubes	for 18(dia.) x 180 (L) test tube, Number of partitions: 5×10	1								
	Weighing Paper	Weighing Paper 500pcs/box, Large (Size: approx. 120 x 120 mm)	1								
		Weighing Paper 500pcs/box, Small (Size: approx. 90 x 90 mm)	1								
	Vacuum Pump	Capacity: 1.08-1.3 liter/min, Ultimate vacuum: 440mmHg	1	Aug. 6, 2006							
	Glass fiber filter paper*1	φ50 mm, 100 pcs (Low gas absorption type) for Air Sampling	2								
	Quartz fiber filter paper*1	8'×10', 25 pcs	1								
	Glass fiber filter paper*1	8'×10', 100 pcs	2								
	Membrane filter	0.45μm, φ47 mm, 100 pcs cellulose	2	Aug. 6, 2006							
	pH Paper	pH paper: Roll type, 4 pcs/case	2								
	Pipet container	Applox. 450 (W) × 300 (D)) × 70 (H) mm	1								
	Pipet support	Plastic or more fine quality, Size: Approx. 200×170×250 (H) mm, H tipe	1	Aug. 6, 2006							
	Stand for micro pipet	Number of sets of syringes : 5-6 psc	1								
	Waste water container	Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 20 L, Color: White, Stopper: Two	8								
		Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 5 L, Color: White, Stopper: One	8								
	Flask filtering	1000 ml, Borosilicate glass	1								
	Seal tape	Made of teflon, Applox. 10mm× 15 m	2	Aug. 6, 2006							
	Paraffin film	4" × 125 feet	2								
	Pipet cleaner	Inside size of basket: Approx. 500×φ136 mm	1								
Check person											

Maintenance record tables of glasswares (4)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Brush	For bottle washing (small: No2)	2								
		For bottle washing (middle: No5)	2								
		For bottle washing (large: No10)	2								
		For Pipettes	2								
	Color comparition tubes	50 ml, with white graduated, With stopping	10								
	Color comparition tubes	100 ml, 2 ring marks, Cylinder. Tall form, Germany	4	Aug. 6, 2006							
	Tube support	For color comparition, For 100ml color comparition tube ×10 pcs	1								
	Pasteur Pipette	150 mm, 1000 pcs, Borosilicate	1								
		230 mm, 1000 pcs, Borosilicate	1								
	Dropping Bottle	50 ml	2								
		100 ml	1								
	Crucible	Crucible, porcelain, 38 ml	10								
		Crucible, porcelain, 50ml	10								
	Porcelain dish tongs	Porcelain dish tongs	1								
	Standard Sieve	Applox. Φ200 mm, mesh: 2mm	1								
	Weighning Bottle	Applox. φ50mm, H35mm	5								
	Desiccator	Desiccator, glass, 180mm (dia.)	1								
	Conical beaker	250 ml	10								
	Bottle for sample collection	1000 ml, Polypropylene, with screw closure, Wide-mouse bottle,	20	Aug. 6, 2006							
	Rubber Bulb for Small Pipette	Vinyl-methyl Silicon rubber for graduated pipettes (1ml)	2								
		Vinyl-methyl Silicon rubber for graduated pipettes (5ml)	2								
	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	2								
	Cleaning Tissue	45 boxes of 200 tissues	1								
	Goggles	Plastic, with side guard	2								
	Cleaning Agent	For removing grease, oil, wax, dye residue, silicone, etc. Volume: 2 liters	1								
	Burret	Burret 25 ml , Color: clear	2								
		Burret 50 ml , Color: clear	2								
	Burret stand	Double holder	1								
Check person											

Record of usage condition for reagent (1)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

Management No.	Name	Specifications			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
1	Acetic acid (CH_3COOH)	NO2	G	2.5 L	1	Aug. 6, 2006									
2	Sulfanilic acid ($H_2NC_5H_4SO_3H$)	NO2	G	100g	1										
3	*N*-(1-Naphthyl) ethylenediamine dihydrochloride For NOx analysis ($C10H7NHCH2CH2NH2 \cdot 2H2O$)	NO2	—	25g	1	Aug. 23, 2006									
4	Potassium permanganate For NOx analysis ($KMnO_4$)	NO2	—	1 kg	1	Aug. 6, 2006									
5	Sulfuric acid (H_2SO_4)	NO2, F	G	2.5 L	1	July 2006									
6	Sodium nitrite ($NaNO_2$)	NO2	G	500g	1	Aug. 6, 2006									
7	Chloroform, certified ($CHCl_3$)	NO2	UGR	2.5 L	1										
8	Barium hydroxide octahydrat ($Ba(OH)_2 \cdot 8H_2O$)	NO2	G	500g	1										
9	Triethanol amine ($N(CH_2CH_2OH)_3$)	NO2	G	500ml	1										
10	Sodium azide (NaN_3)	SO2	G	100g	1	Aug. 6, 2006									
12	Hydroclolic acid (HCL)	SO2	G	2.5 L	1										
13	Formaldehyde	SO2	G	2.5 L	1										
14	Sodium hydrogen sulfite 40% Solution (NaHSO3)	SO2	G	1.0L	1										
15	Iodine (0.1 N)	SO2,Ox	—	500ml	1										
16	Sodium sulfate (Na_2SO_4)	SO2	G	500g	1										
17	Mercury (II) chloride ($HgCL_2$)	SO2	G	500g	1										
18	Sodium chloride (NaCL)	SO2	G	1 kg	1										
19	Glycerin ($HOCH_2CHOHCH_2OH$)	SO2	G	1 L	2										
20	Starch, soluble ($(C_6H_{10}O_5)n$)	SO2,Ox	1	1 kg	1										
21	Mercury (II) iodide, red (HgI_2)	SO2	G	100g	1										
22	Sodium thiosulfate pentahydrate ($Na_2S_2O_3 \cdot 5H_2O$)	SO2,Ox	Semi-G	1 kg	1										
23	Potassium iodate (KIO_3)	SO2	G	100g	1	July 2006									
24	Potassium iodide (KI)	SO2	G	1 kg	1										
25	Hydrochloric acid (1 N) (1N-HCL)	SO2	G	1 L	1	Aug. 6, 2006									
26	Sodium fluorid (NaF)	F	G	500g	1										
27	Lanthanum nitrate hexahydrate (La(NO3)3・6H2O)	F	Semi-G	25g	1										
28	Alizarin complexone dihidrate, indicator grade ($C19H15NO8 \cdot 2H2O$)	F	—	1g	1	Aug. 23, 2006									
29	Silicon dioxide (SiO2)	F	G	500g	1	Aug. 6, 2006									
30	Fhosphoric acid (H3PO4)	F	G	2.5L	1										
31	Phenolphthalein ($C20H14O4$)	F	G	100g	1										
32	Perchloric acid (HCLO4)	F	G	1 L	1	July 2006									
33	Sodium hydroxide, pellets (NaOH)	F	G	1 kg	1										
Check person															

Record of usage condition for reagent (2)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	Name	Specifications			Q'ty	Date of	Expiration	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total	Delivery	date for use	/	/	/	/	/	/	/	/
34	Ammonia solution, 25% (NH4OH)	F	G	2.5 L	1	Aug. 6, 2006									
35	Ammonium acetate, >98% (CH3COONH4)	F	Semi-G	500g	1										
36	Sodium acetate, trihydrate	F	G	500g	1										
37	Acetone	F	G	2.5 L	2										
38	Potassium dihydrogenephosphat (KH2PO4)	Ox	―	500g	1										
39	Disodium hydrogen phosphate-12water (Na2HPO4・12H2O)	Ox	G	1 kg	1										
40	Potassium iodide (KI)	Ox	G	1 kg	1	July 2006									
41	Iodine (I)	Ox, SO2	G	500g	1	Aug. 6, 2006									
42	Nessler's reagent	NH3	-	500ml	1										
43	Methylene blue	H2S	G	100g	1										
44	Phosphoric Acid (H3PO4)	NO2	G	2.5 L	1										
45	Sulfanilamide	NO2	G	500g	1										
Check person															

Record of usage condition for reagent (3)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	**Name**	**Specifications**			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
Check person															

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-1
Preparation for Glassware (Flasks, etc.)

دليل التشغيل و الصيانة لتحليل المعادن
تحضير الزجاجيات (الدوارق و غيرها)

Prepared by:_____ **Date:** _____
Chemist

Reviewed by:_____ **Date:** _____
Laboratory Chief or Quality Assurance Coordinator

إعداد: **الكيميائي** _____ **تاريخ:** _____

مراجعة:_____ **تاريخ:** _____
منسق المخبر الرئيسي أو منسق ضمان الجودة

Damascus DFEA

مديرية دمشق

1. **Scope and Application:** For preparing glassware which are needed to use during analyzing using A.A.S.
2. **Necessary Equipment and Supplies:**
   1) Acidified tap water with HNO3 5%.

1. **المجال والتطبيق :** لتحضير الزجاجيات اللازمة للاستخدام خلال التحليل باستخدام جهاز الامتصاص الذري.
2. **أجهزة ومواد ضرورية:**

1) ماء صنبور محمض بحمض الأزوت بنسبة 5%.

3- Preparing Procedure:

3- إجرائية التحضير:

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
1	Wash the outer walls of glassware with a lot of tap water.		قم بغسل الجدران الخارجية للزجاجيات بكمية كبيرة من ماء الصنبور.
2	Fill in tap water and flush.		قم بملء و تفريغ الزجاجيات بماء الصنبور.
3	Repeat filling and flushing (at least twice)		قم بإعادة الملأ و التفريغ (على الأقل مرتين).
4	Soak them into acidified water completely without air remaining inside. ! Wear GLOVES, a MASK and an EYEPROTECTION as you're handling acids		قم بنقع الزجاجيات في ماء محمض بشكل كامل دون ترك هواء داخل الزجاجيات. ! قم بارتداء القفازات و القناع و النظارات أثناء التعامل مع الحمض.

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
5	Leave them overnight		اترك الزجاجيات منقوعة خلال الليل.
6	Take out glassware **VERY CAREFULLY** so as not to slosh acids		قم بإخراج الزجاجيات بحذر شديد دون أن تكون ممتلئة بالحمض.
7	Wash the outer walls of glassware with a lot of tap water. (DO NOT TOUCH glassware before washing carefully.)		قم بغسل الجدران الخارجية للزجاجيات بكمية كبيرة من ماء الصنبور. (لا تقم بملامسة الزجاجيات قبل غسلها بشكل جيد.)
8	Fill in tap water and flush.		قم بملء و تفريغ الزجاجيات بماء الصنبور.

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
9	Repeat filling and flushing (at least twice)		قم بإعادة الملأ و التفريغ (على الأقل مرتين).
10	Fill in tap water and store them with stoppers.		قم بملء الزجاجيات بماء الصنبور و قم بتخزينها مع أغطيتها.
11			
12			

END ***النهاية***

Operation and Maintenance Manual for Metal Analysis (O/M Manual)- 2
Preparation for Glassware (Pippets)

دليل التشغيل و الصيانة لتحليل المعادن
تحضير الزجاجيات (الماصات)

Prepared by:_____ **Date:** _____
Chemist

Reviewed by:_____ **Date:** _____
Laboratory Chief or Quality Assurance Coordinator

إعداد: الكيميائي _____ **تاريخ:** _____

مراجعة:_____ **تاريخ:** _____
منسق المخبر الرئيسي أو منسق ضمان الجودة

Damascus DFEA

مديرية دمشق

1. **Scope and Application:** For preparing glassware which are needed to use during analyzing using A.A.S.
2. **Necessary Equipment and Supplies:**
   1) Acidified tap water with HNO3 5%.
   2) Pippets washing kit.

1. **المجال والتطبيق:** لتحضير الزجاجيات اللازمة للاستخدام خلال التحليل باستخدام جهاز الامتصاص الذري.
2. **أجهزة ومواد ضرورية:**
   1) ماء صنبور محمض بحمض الأزوت بنسبة 5%.
   2) مجموعة تنظيف ماصات.

3. Preparing Procedure:

3. إجرائية التحضير:

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
1	Wash the inner and outer walls of pippets with tap water.		قم بغسل الجدران الداخلية و الخارجية للماصات بماء الصنبور.
2	Repeat washing (at least twice).		قم بإعادة الغسيل (مرتين على الأقل).
3	Put them upside down in the special basket for pippets.		ضع الماصات بشكل مقلوب في السلة الخاصة بالماصات.
4	Soak them into acidified water completely. ! Wear GLOVES, a MASK and an EYEPROTECTION as you're handling acids		قم بنقع الماصات بشكل كامل في الماء المحمض . ! قم بارتداء القفازات و القناع و النظارات أثناء التعامل مع الحمض

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
5	Leave them in a safe place overnight		اترك الماصات منقوعة خلال الليل.
6	Take out pippets **VERY CAREFULLY** so as not to slosh acids and put them in a larger container for rinsing.		قم بإخراج الماصات بحذر شديد دون أن تكون ممتلئة بالحمض و ضعها في حاوية كبيرة للغسيل.
7	Fill in the container with tap water and rinse pippets by moving the basket up and down (at least 5 times ups and downs).		قم بتعبئة الحاوية بماء الصنبور و قم بشطف الماصات بتحريك السلة للأسفل و الأعلى (على الأقل خمس مرات للأعلى و الأسفل).
8	Take pippets out and flush tap water.		أخرج الماصات و فرغها من ماء الصنبور.

Step (الخطوة)	**Operation**	**Remarks (ملاحظات)**	**التشغيل**
9	Repeat 7-8 (at least twice)		أعد الخطوات 7 و 8 (على الأقل مرتين).
10	Rinse the inner and outer walls of pippets with distilled water repeatedly (at least twice).		اشطف الجدران الداخلية و الخارجية للماصات بالماء المقطر عدة مرات (على الأقل مرتين).
11	Put them in a dryer to be ready for uses.		ضع الماصات في المجففة لتصبح جاهزة للاستعمال
12	Store them in shelves with pippet stands.		قم بحفظ الماصات على الرفوف في حوامل الماصات.

END ***النهاية***

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-3
Handling Toxins -1

دليل التشغيل و الصيانة لتحليل المعادن
التعامل مع المواد السامة - 1

Prepared by:_____ **Date:** _____
Chemist

Reviewed by:_____ **Date:** _____
Laboratory Chief or Quality Assurance Coordinator

إعداد: الكيميائي _____ **تاريخ:** _____

مراجعة:_____ **تاريخ:** _____
منسق المخبر الرئيسي أو منسق ضمان الجودة

Damascus DFEA

مديرية دمشق

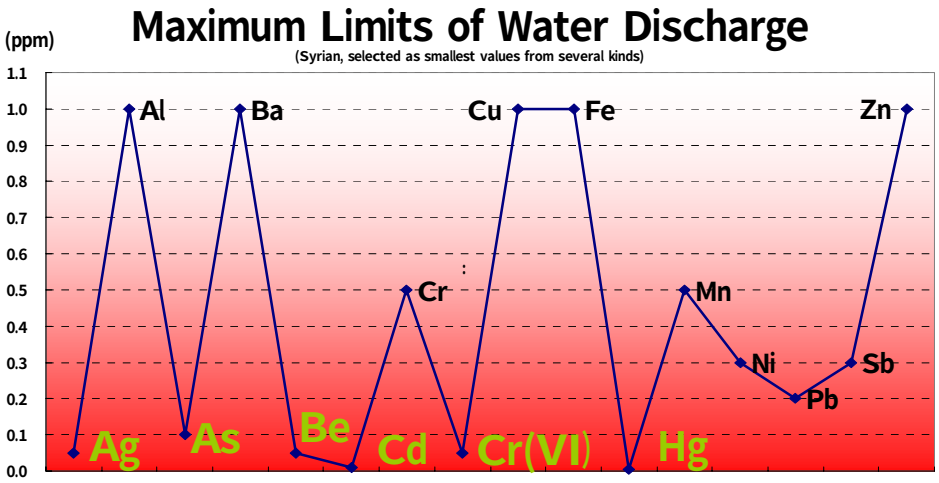
1. Scope and Application: For dealing with toxins during analyzing using A.A.S.

We have to be extremely careful about highly toxic substances like elements shown in the bottom of the figure below. This figure shows the maximum limits of discharge and meaning lower concentrations are more harmful. Especially, Cd, Cr(VI), Hg, etc are dangerous even in ppb levels.

2. Necessary Equipment and Supplies:

1) Gloves, a mask and an eye protection.
2) Container.

1. المجال والتطبيق: للتعامل مع المواد السامة خلال التحليل باستخدام جهاز الامتصاص الذري.
يجب علينا أخذ الحذر الشديد عند التعامل مع المواد العالية السمية كالعناصر الظاهرة في أسفل الشكل التالي. يبين هذا الشكل الحدود العظمى للصرف فعندما يكون التركيز المسموح أقل فهذا يعني أن المادة أكثر سمية. خاصة الكادميوم و الكروم السداسي و الزئبق... حيث أنها خطرة حتى عندما تكون بتراكيز من ppb.



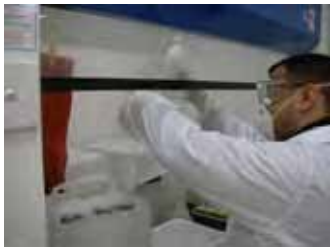
2. أجهزة ومواد ضرورية:

1) قفازات و قناع واقي و نظارات.
2) حاوية.

3. Handling Standard Solutions Procedure:

3. إجرائية التعامل مع المحاليل العيارية:

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
1	You must ware gloves, a mask and an eye protection when you handle ANY STD.		يجب إرتداء القفازات و القناع و النظارات عند التعامل مع أي من المحاليل العيارية.
2	Keep any tool you use with STD and Keep them above the container even when you are holding them.		أبقي جانباً أي أداة مستخدمة للمحاليل العيارية و أبقها فوق حاوية خاصة حتى عند العمل بهذه الأدوات.
3	Keep tools you have used in the container.		أبقي الأدوات التي قمت باستخدامها في حاوية خاصة.
4	Try to close lids or stoppers as soon as possible.		حاول وضع الأغطية و السدادات بأسرع ما يمكن.

Step (الخطوة)	**Operation**	**Remarks** (ملاحظات)	**التشغيل**
5	Rinse everything you need to use later with tap water and transfer them to another clean container.		قم بغسل أي شيء تحتاج لاستخدامه لاحقاً بالماء المقطر و قم بنقله إلى حاوية أخرى نظيفة.
6	Flush out everything you have to wash with tap water into “Heavy Metal Waste” tank. Flush inner and outer wall of each tool to get rid of toxin on it.		قم بتفريغ كل شيء تريد غسله في حاوية “Heavy Metal Waste” قم بغسيل الجدران الداخلية و الخارجية لكل أداة للتخلص من السموم الموجودة فيها.
7	Don’t forget to flush out the container and the funnel you used.		لا تنس تفريغ الحاوية التي عملت فوقها و القمع الذي استخدمته.
8	Follow the O/M manual for washing afterwards.		قم بإتباع دليل التشغيل و الصيانة الخاص بالغسيل بعد ذلك.

END ***النهاية***

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-4
Handling Toxins -2

دليل التشغيل و الصيانة لتحليل المعادن
التعامل مع المواد السامة - 2

Prepared by:_____ **Date:** _____
Chemist

Reviewed by:_____ **Date:** _____
Laboratory Chief or Quality Assurance Coordinator

إعداد: الكيميائي _____ **تاريخ:** _____

مراجعة:_____ **تاريخ:** _____
منسق المخبر الرئيسي أو منسق ضمان الجودة

Damascus DFEA

مديرية دمشق

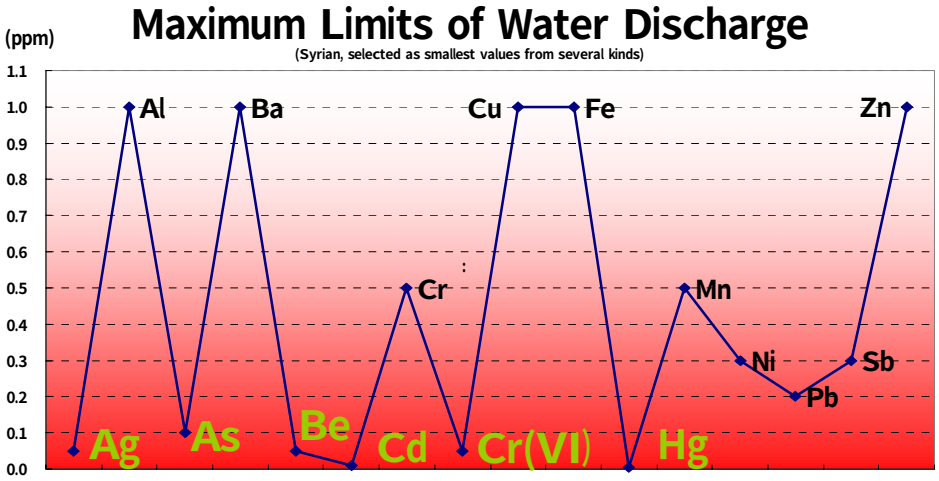
1. Scope and Application: For dealing with toxins during analyzing using A.A.S.

We have to be extremely careful about highly toxic substances like elements shown in the bottom of the figure below. This figure shows the maximum limits of discharge and meaning lower concentrations are more harmful. Especially, Cd, Cr(VI), Hg, etc are dangerous even in ppb levels.

2. Necessary Equipment and Supplies:

1) Gloves, a mask and an eye protection.
2) Container.

1. المجال والتطبيق: للتعامل مع المواد السامة خلال التحليل باستخدام جهاز الامتصاص الذري.
يجب علينا أخذ الحذر الشديد عند التعامل مع المواد العالية السمية كالعناصر الظاهرة في أسفل الشكل التالي. يبين هذا الشكل الحدود العظمى للصرف فعندما يكون التركيز المسموح أقل فهذا يعني أن المادة أكثر سمية. خاصة الكادميوم و الكروم السداسي و الزئبق... حيث أنها خطرة حتى عندما تكون بتراكيز من ppb.



2. أجهزة ومواد ضرورية:

1) قفازات و قناع واقي و نظارات.
2) حاوية.

There is no safe STD. You should ware Gloves, a Mask and an EyeProtection whenever you handle STDs.
No Food nor Drink is allowed in the AAS room.
ليس هناك أي محلول عياري آمن. يجب ارتداء القفازات و القناع و النظارات عند التعامل مع المحاليل العيارية.
يمنع تناول الطعام و الشراب في غرفة جهاز الامتصاص الذري.

3. Handling Standard Solutions Procedure:

3. إجرائية التعامل مع المحاليل العيارية:

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
1	You **MUST NOT** handle STDs for furnace with your bare hands (ware Gloves and a Mask).		يجب عدم التعامل مع المحاليل القياسية الخاصة بالفرن بيدين عاريتين (قم بارتداء القفازات و القناع).
2	Use a suitable disposal pipette to transfer STD into vials in the container.		قم باستخدام الماصة الغير متعددة الاستعمالات الخاصة بالمحلول القياسي لنقل المحلول القياسي إلى الأنابيب و ذلك ضمن حاوية.
			
3	Transfer the vial just after you fill because it is likely to fall down.		قم بوضع الأنابيب مباشر بعد الملأ في حاملة الأنابيب خشية من وقوعها.

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
4	Rinse used pipette with tap water and DIW respectively and put it into the original position.		قم بغسيل الماصة المستعملة بماء الصنبور ثم بالماء المقطر ثم قم بإرجاعها إلى موضعها الأصلي.
5	After measurement, throw the contents of vials into the waste tank for heavy metals. Throw the tap water and the DIW into waste tank for acidified water.		بعد القياس قم بتفريغ محتوى الأنابيب في الحاوية الخاصة بفضلات المعادن الثقيلة. و قم بإفراغ محتوى حاويتي الماء المقطر و الماء المقطر في الحاوية الخاصة بالماء المحمض.
6	Flush vials with much amount of tap water.		قم بغسيل الأنابيب بكمية كبيرة من ماء الصنبور.
7	Wash gloves at the end and throw them into a garbage box.		في النهاية قم بغسل القفازات و قم برميها في سلة المهملات.

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
8	Wash your hands very well to finish.		قم بغسل يديك بشكل جيد بعد الانتهاء.

END ***النهاية***

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-5
Handling Toxins -3

دليل التشغيل و الصيانة لتحليل المعادن
التعامل مع المواد السامة - 3

Prepared by:_____ **Date:** _____
Chemist

Reviewed by:_____ **Date:** _____
Laboratory Chief or Quality Assurance Coordinator

إعداد: الكيميائي _____ **تاريخ:** _____

مراجعة:_____ **تاريخ:** _____
منسق المخبر الرئيسي أو منسق ضمان الجودة

Damascus DFEA

مديرية دمشق

1. Scope and Application: For dealing with toxins during analyzing using A.A.S.

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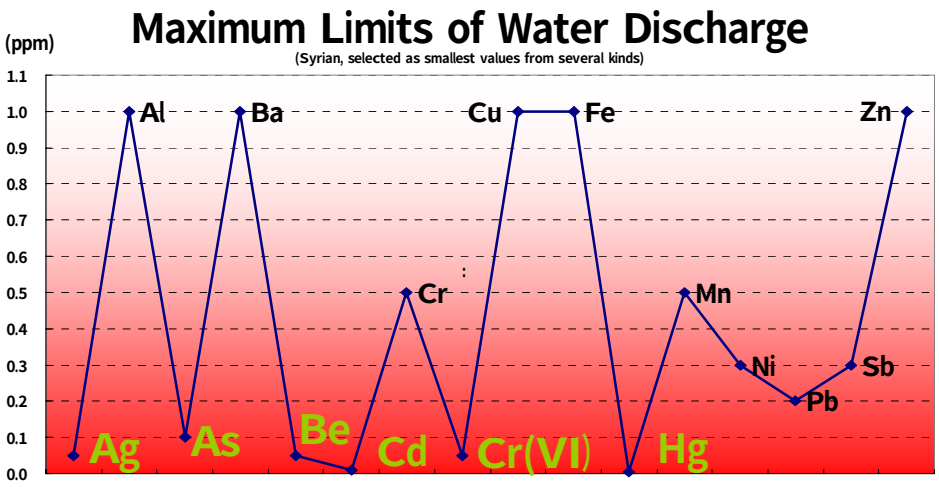
2. Necessary Equipment and Supplies:

1) Gloves, a mask and an eye protection.

1. المجال والتطبيق:

للتعامل مع المواد السامة خلال التحليل باستخدام جهاز الامتصاص الذري.
يجب علينا أخذ الحذر الشديد عند التعامل مع المواد العالية السمية كالعناصر الظاهرة في أسفل الشكل التالي. يبين هذا الشكل الحدود العظمى للصرف فعندما يكون التركيز المسموح أقل فهذا يعني أن المادة أكثر سمية. خاصة الكادميوم و الكروم السداسي و الزئبق... حيث أنها خطرة حتى عندما تكون بتراكيز من ppb.



2. أجهزة ومواد ضرورية:

1) قفازات و قناع واقي و نظارات.

3. Handling Waste Samples Solutions Procedure:

3. إجرائية التعامل مع فضلات العينات:

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
1	Dispose of solutions with Ag, As, Be, Cd, Cr and Hg into "Heavy Metal" tank and flush down the container as well to get rid of toxins thoroughly.		قم بالتخلص من محاليل الفضة و الزرنيخ و البيريليوم و الكادميوم و الكروم في حاوية "Heavy Metal" ثم قم بغسل الأنابيب الموجودة فيها هذه المحاليل إلى داخل الحاوية للتخلص بشكل كامل من المواد السامة.
2	Dispose of solutions with elements in black in the table into "Heavy Metal" tank if their concentrations are higher than Limits of Discharge.		قم بالتخلص من المحاليل التي تحتوي العناصر الموجودة في الجدول باللون الأسود في حاوية "Heavy Metal" في حال كان تركيزها أكبر من حدود الصرف.
3	Dispose of solutions with elements in black into "Acidified Water" tank for neutralization and dilution.		قم بالتخلص من المحاليل التي تحتوي العناصر الموجودة في الجدول باللون الأسود في حاوية "Acidified Water" بتراكيز أقل من حدود الصرف لتعديلها و تمديدها.
4	Do not forget flushing down the funnel if you used.		لا تنس تنظيف القمع داخل الحاوية في حال تم استخدامه.

Step (الخطوة)	Operation	Remarks (ملاحظات)	التشغيل
5	Rinse containers with much amount of tap water.		قم بغسل الأنابيب بكمية كبيرة من ماء الصنبور.
6	Wash out your hands very carefully.		قم بغسل يديك بحذر شديد.

Ware WHITE CLOTHS, GLOVES, a MASK, an EYEPROTECTION when you handle TOXINS !!
قم بارتداد اللباس الأبيض و القناع و النظارات عندما تتعامل مع المواد السامة !!

END ***النهاية***

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-6 Consumables and Budget Planning

Consumables and Budget Planning

For the 1st year's budget planning, temporary draft is considered as following. This should be modified considering every years actual expense.

1) Reagents : Reference Table below shows the initial quotation for the 1st year. All reagents should not be consumed. If the rate of consumption is assumed as 70%, about $2,350 will be required.
2) Apparatus : This consists of tools and consumables. If tools have been maintained well and only consumables have been disposed, about $275 will be required.
3) AAS : If 10 cylinders of gases and all reagents have been consumed, about $4,400 will be required. And if 10 Pyro and 10 HD - graphite tubes have been consumed, about $1,400 will be required.

If these assumptions are adopted, about $8,300 will be required.

Necessary information is mentioned below ;

المستهلكات و تحضير الميزانية

لتحضير ميزانية العام الأول تم تحضير مسودة مؤقتة كما يلي. يجب لهذه المسودة أن تعدل كل سنة بأخذ الأسعار الجديدة بعين الاعتبار.

1. الكواشف: يظهر الجدول المرجعي التقدير الأولي للسنة الأولى. لا يفترض استهلاك جميع الكواشف. بفرض أن معدل الاستهلاك هو 70% فسيكون هناك حاجة ل 2350 $.
2. المعدات: تتضمن الأدوات و المستهلكات. في تمت المحافظة على الأدوات بشكل جيد و فقط تم استهلاك المستهلكات فسيكون هناك حاجة ل 275$.
3. جهاز الامتصاص الذري: في حال تم استهلاك جميع اسطوانات الغاز (10 أسطوانات) و جميع الكواشف فسيكون هنالك حاجة ل 4400$. و في حال استهلاك 10 أنابيب غرافيتية Pyro و 10 HD فسيكون هنالك حاجة ل 1400$.

في حال جمع هذه البنود فسيكون المطلوب 8300$.

أن المعلومات الضرورية موجودة في الأسفل:

الجدول المرجعي للوكلاء

Agency	AL-AHAHBA	MASK Scientific	ALBA Instruments & Chemicals
Subject	AAS and accessories	Apparatus and reagents	Apparatus and reagents
Telephone	+963 11 4441019	+963 11 333 3798 +963 11 3336013	+963 11 442 6689
Facsimile	+963 11 4410364	+963 11 331 3551	+963 11 441 0305
Address	Al Abed St., Al Buhturi Lane No	Shukri Asali St. Agou Rhomaneh 8, Al Nejemeh Square, DAM	Azbakieh, DAM
Personnel	Mr. Mostafa Sadeddeen Mr. Hussam Nabhani	Mr. Assaad Khaled, G. M.	Mr. Antoun Doummar
E-mail address	teriaki@scs-net.org	mask@scs-net.org	antoundoummar@mail.sy

الجدول المرجعي لأسعار الكواشف

29-Jun-06

No.	Name	Specification	Unit	Quantity	Price US$				
					ALBA	MASK	adopted		
					Unit	Unit	Unit	Agency	Sub total
1	Nitric acid, HNO_3	solution, conc (65%), trace analysis grade	2.5L	20L	-	88.68	88.68	MASK	709.43
2	Nitric acid, HNO_3	solution, 60%, lowest grade	2.5L	30L	35.00	-	35.00	ALBA	420.00
3	Potassium permanganate, $KMnO_4$	extra pure / trace analysis grade	500g	1,000g	(46)	86.79	86.79	MASK	173.58
4	Potassium persulfate, $K_2S_2O_8$	extra pure / trace analysis grade	500g	500g	108.00	49.06	49.06	MASK	49.06
5	Sodium chloride, NaCl	extra pure / trace analysis grade	1,000g	2,000g	-	18.87	18.87	MASK	37.74
6	Hydroxylamin sulfate (Hydroxylammonium sulfate), $(NH_2OH)_2 \cdot H_2SO_4$	analytical or reagent grade	250g	1,500g	115.00	-	115.00	ALBA	690.00
7	Stannous chloride (Tin(II) chloride), $SnCl_2$	reagent or extra pure grade	1,000g	1,000g	-	147.17	147.17	MASK	147.17
8	Stannous sulfate (Tin(II) sulfate), $SnSO_4$	reagent or extra pure grade	1,000g	1,000g	800.00	99.62	99.62	MASK	99.62
9	Sulfuric acid, H_2SO_4	solution, conc (95-98%), extra pure or trace analysis grade	2.5L	5L	28.00	-	28.00	ALBA	56.00
10	Magnesium perchlorate, $Mg(ClO_4)_2$	lowest grade	1,000g	1,000g	1100.00	607.55	607.55	MASK	607.55
11	Hydrochloric acid, HCl	solution, conc (36% or more), extra pure or trace analysis grade	2.5L	7.5L	20.00	16.23	16.23	MASK	48.68
12	Sodium borohydride, $NaBH_4$	analytical or trace metals grade	100g	100g	-	216.98	216.98	MASK	216.98
13	Sodium hydroxide, NaOH	pellets, analytical or extra pure grade	1,000g	1,000g	18.00	18.87	18.00	ALBA	18.00
14	Sulfanilamide, C6H8N2SO2	analytical or extra pure grade	250g	250g	95.00	90.57	90.57	MASK	90.57
Total									3,364

29-Jun-06

No.	Name	Specification	Q'ty	Price US$			Cheapest × Q'ty
				ALBA Unit	MASK Unit	T&L. App. Unit	
1	Beaker	Glass, Griffin squat form, 100mL	60	2.20	1.79	2.25	107.55
		Glass, Griffin squat form, 150mL	30	2.50	2.45	3.00	73.58
		PTFE, Griffin squat form, 100mL	40	-	-	18.00	720.00
		Polypropylene, Griffin squat form, 500-600mL	10	3.00	3.49	2.00	20.00
2	Bottle	Polypropylene or HDPE, white, screw closure (leak-proof), rectangle, with handle, 20L	4	5.20	-	4.50	18.00
		Polypropylene or HDPE, white, screw closure (leak-proof), wide neck, 100mL	200	-	-	1.25	250.00
		Polypropylene or HDPE, white, screw closure (leak-proof), wide neck, 250mL	30	-	-	3.00	90.00
		Polypropylene or HDPE, white, round-shaped, screw closure (leak-proof), 1000mL	500	4.00	-	3.75	1875.00
		Polypropylene or HDPE, white, round-shaped, screw closure (leak-proof), 2L	20	-	-	6.50	130.00
3	Brush	Φ 10 to 12 mm	10	2.00	0.94	1.25	9.43
		Φ 16 to 25 mm	10	2.20	0.94	1.50	9.43
4	Bucket	Polypropylene or HDPE, with pouring spout and rigid handle	3	3.00	2.36	-	7.08
		Polypropylene or HDPE, rectangular shape, 250 * 180 * 150 mm or larger in total	3	2.00	-	-	6.00
5	Cylinder	Glass, spouted, 50mL, grads. 1mL, tolerance ±0.25mL	4	5.50	5.19	8.00	20.75
		Glass, spouted, 100mL, grads. 1mL, tolerance ±0.5mL	4	6.50	6.23	8.50	24.91
		Glass, joint and stopper, 100mL, grads. 1mL	30	15.00	14.15	17.00	424.53
6	Eye protection	Polycarbonate, with clear lenses, browguard and hinged sidearms, can be worn over spectacles, large	5	10.00	26.42	-	50.00
7	Face mask	Disposable, with metal nose piece, standard sized	200	0.16	0.06	-	11.32
8	Filtration paper	Cellulose, pore size 2.7um or similar, Φ 90-110mm, hardened (high wet strength and chemical resistance), ashless (<0.01%ash), 100pcs/pack	4	13.50	-	-	54.00
		Cellulose, pore size 8um or similar, Φ 90-110mm, hardened (high wet strength and chemical resistance), ashless (<0.01%ash), 100pcs/pack	2	13.50	-	-	27.00
9	Flask	Glass, Erlenmeyer, wide neck, graduated, 250mL, clear	30	3.50	3.30	17.00	99.06
		Glass, Erlenmeyer, narrow neck, graduated, 300mL, clear, stoppered or screw cap	3	8.40	7.92	36.00	23.77
		Glass, volumetric, 50mL, tolerance ±0.06mL or better, clear, joint and stopper	10	6.40	5.28	7.50	52.83
		Glass, volumetric, 100mL, tolerance ±0.1mL or better, clear, joint and stopper	40	6.70	6.32	9.00	252.83
		Glass, volumetric, 200mL, tolerance ±0.15mL or better, clear, joint and stopper	6	8.50	8.96	12.00	51.00
		Glass, volumetric, 500mL, tolerance ±0.25mL or better, clear, joint and stopper	10	11.70	11.32	14.00	113.21
		Glass, volumetric, 1000mL, tolerance ±0.4mL or better, clear, joint and stopper	3	20.00	17.36	18.00	52.08
		Polymethylpentane or polypropylene, volumetric, 100mL, limit of error 0.16mL or better, clear or half-clear, joint and stopper	20	7.00	-	-	140.00
10	Funnel	Polypropylene, Φ 60mm or similar	30	1.00	-	3.50	30.00
		Polypropylene, Φ 150mm or similar	5	1.50	-	10.00	7.50
11	Glove	Polyethylene, disposable, textured surface, non-sterile, medium, 100pcs/pack	3	6.00	-	50.00	18.00
		Latex, disposable, examination, lightly powdered or powder free, non-sterile, medium, 100pcs/pack	5	-	-	14.00	70.00
		Neoprene, long (elbow-length), acid resistant, abrasion and puncture resistant, large	2	-	30.19	-	60.38
12	Hot plate	Ceramic, 200-250 * 200-250mm, with temperature control (ambient to 300°C or	3	618.00	-	850.00	1854.00
13	Indicator paper (pH)	Dispenser reel, 5m long * 6mm wide or similar, with reference chart showing color changes. pH range 1-11 or wider	4	10.00	7.55	7.50	30.00
14	Label tape	Paper, roll, self-adhesive, dimensions 24 * 12.5mm or similar, 100pcs/pack	20	0.50	-	-	10.00
15	Pipette	Polyethylene, graduated, Pasteur, capacity 3-5mL, 500pcs/pack	1	20.00	33.02	1700.00	20.00
		Glass, graduated, 1mL, grads. 0.01mL, tolerance ±0.006 or better	4	2.00	1.04	1.50	4.15
		Glass, graduated, 2mL, grads. 0.02mL, tolerance ±0.01 or better	6	2.50	1.17	1.75	7.02
		Glass, graduated, 5mL, grads. 0.05mL, tolerance ±0.03 or better	6	2.00	1.36	2.00	8.15
		Glass, graduated, 10mL, grads. 0.1mL, tolerance ±0.05 or better	6	2.50	1.43	2.50	8.60
		Glass, graduated, 25mL, grads. 0.2mL, tolerance ±0.1 or better	4	-	4.81	5.00	19.25
		Glass, one mark (whole), 1mL ,tolerance ±0.008mL or better	6	3.00	1.70	2.50	10.19
		Glass, one mark (whole), 2mL ,tolerance ±0.01mL or better	4	3.00	1.89	3.00	7.55
		Glass, one mark (whole), 5mL ,tolerance ±0.015mL or better	4	3.50	2.36	4.00	9.43
		Glass, one mark (whole), 10mL ,tolerance ±0.02mL or better	4	-	3.30	4.75	13.21
		Glass, one mark (whole), 20mL ,tolerance ±0.03mL or better	4	5.00	-	6.00	20.00
16	Pipette filler	Molded rubber bulb, approx. 60mL capacity, 3 glass ball valves, suitable for pipettes of 2-25mL or wider	3	11.00	7.55	8.50	22.64
		Plastic, capacity 0.5-2mL or wider, standard release speed	2	11.50	7.08	-	14.15
		Plastic, capacity 2-10mL or wider, standard release speed	2	11.50	7.55	-	15.09
		Plastic, capacity 10-25mL or wider, standard release speed	2	12.00	8.49	-	16.98
17	Pipette jar	Plastic, Φ 80 height 420 (cylinder) or larger	2	62.00	14.72	-	29.43
18	Pipette stand	Plastic, horizontal, holding 6 or more	4	-	9.43	24.00	37.74
		Plastic, vertical, holding 20 or more, for drying and storage	3	30.00	18.87	31.00	56.60
19	Sealing film	width 100mm length 30m or longer, can be enlarged as much as 10 or more times the original area	2	33.30	27.36	30.00	54.72
20	Soak jar	Plastic container, acid resistant, 50-80L	1	15.00	-	-	15.00
21	Tray	Plastic, shallow, 450 * 350 * 30 mm or similar	20	1.50	-	-	30.00
		Plastic, rigid, 400 * 300 * 70 mm or similar	10	6.50	-	-	65.00
		Plastic, rigid, 600 * 350 * 150 mm or similar, suitable for the soak jar	10	6.50	-	-	65.00
22	Trolley	Plastic or plastic coated, two or more shelves, with casters, 850(w) * 1000(d) * 850(h) mm or similar	2	35.00	-	-	70.00
23	Wash bottle	Polyethylene, narrow neck, leak-proof, with rinser tube, imported, 1000mL	10	-	-	4.00	40.00
24	Watch glass	Glass, 65-75mm	40	4.20	-	1.50	60.00
		PTFE, 65-75mm	40	-	-	16.00	640.00
Total							8153.14

Item No.	Name of equipment	Required technical specifications	Unit Price
	Lamp	◇ Hollow cathode lamp for each element	
		lamp for Ag	395
		lamp for Al	370
		lamp for As	560
		lamp for Ba	470
		lamp for Be	450
		lamp for Cd	390
		lamp for Cr	370
		lamp for Cu	470
		lamp for Fe	370
		lamp for Hg	395
		lamp for Mn	450
		lamp for Ni	370
		lamp for Pb	390
		lamp for Sb	390
		lamp for Zn	490
		Sub total	6,330
	Gas supply	◇ Gas cylinder	
		acetylene	300
		nitrous oxide	300
		argon	300
	Standard solutions	◇ Standards (1000mg/L, 500mL or more)	
		Standard solution for Ag	70
		Standard solution for Al	70
		Standard solution for As	70
		Standard solution for Ba	70
		Standard solution for Be	70
		Standard solution for Cd	70
		Standard solution for Cr	70
		Standard solution for Cu	70
		Standard solution for Fe	70
		Standard solution for Hg	70
		Standard solution for Mn	70
		Standard solution for Ni	70
		Standard solution for Pb	70
		Standard solution for Sb	70
		Standard solution for Zn	70
		Sub total	1,050
	Matrix modifier	◇ Matrix modifier (Suitable concentration, 100mL or more)	
		$Pd(NO_3)_2$	150
		$Mg(NO_3)_2$	80
		$CaCl_2$	80
		Sub total	310

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-7
Periodical Maintenance of AAS

Periodical Maintenance of AAS

Frequency of maintenance : once per _____ months

dd/mm/yyyy :						

1) Burner maintenance
- Clean the burner head
- Clean the nebulizer and the tube (the tube should be replaced as necessary)
- Clean the chamber

2) Furnace maintenance
- Clean graphite cap, holder, window plate sockets and window plates
- Clean the temperature sensor
- Clean the slide mechanism
- Clean the seal

3) Atomizer positioning adjustment
- Burner positioning adjustment
- Furnace positioning adjustment

4) Replacing the deuterium lamp if necessary

5) Maintenance following Standard Installation Completion Report (modified)

◆ Standard Installation Completion Report

1. Wavelength accuracy

Perform the line search at the slit width of 0.2 nm and check the difference with the setting by using the hollow cathode lamp of Hg. Use the WizAArd, and at the "Optics Parameters" page, repeat the wavelength setting and the line search for each wavelength shown below.

Wavelength	Measured value	Error
253.7 nm	nm	nm
365.0 nm	nm	nm
435.8 nm	nm	nm
546.1 nm	nm	nm

(Error should be in ± 0.30 nm or under)

2. Absorption sensitivity (Flame)

Introduce distilled water (zero calibration water) and standard solution of Cu 2 ppm inside the flame in turn. Then, perform the measurement 5 times repeatedly. Take the average rate of the measured value.

・Parameter

Wavelength: 324.8 nm

Slit Width: 0.5 nm

Pre-Spray Time: 1 sec

Total Time: 3 sec

Average absorbance	Abs

(0.2300 Abs or over)

3. Repeatability (Flame)

Check the % RSD from the data of item “2.”.

% RSD	%

(2.00 % or under)

4. Fluctuation of the reading (Flame)

Check the fluctuation of the reading, when spraying the Cu 2 ppm for 30 seconds.

・Parameter

Wavelength: 324.8 nm

Slit Width: 0.5 nm

Pre-Spray Time: 3 sec

Total Time: 30 sec

Zoom the data line on the Peak Profile window. Then read the noise level with the display of the cursor.

Fluctuation	%

(7.0 % or under)

5. Absorption sensitivity (Furnace)

Introduce Mn 1 ppb standard solution of 20 µl and perform the measurement five times repeatedly. Then take the average rate of the measured value.

・Parameter

Wavelength: 279.5 nm

Slit Width: 0.2 nm

Average absorbance	Abs

(0.1500 Abs or over)

6. Repeatability (Furnace)

Check the % RSD from the data of item”5”.

% RSD	%

(2.50 % or under)

7. Safety mechanism check (Flame)

Check the operation of the safety mechanism (Flame):

(1) Gas leak inspection

(2) Operation of gas pressure monitor

(3) Operation of flame monitor

(4) Operation of drain sensor

(5) Installation check of the nebulizer and joint.

8. Safety mechanism check (Furnace)

Check the operation of the safety mechanism (Furnace):

(1) Operation of cooling water monitor

(2) Operation of gas pressure monitor

(3) Operation of circuit protector

الصيانة الدورية لسبيكتروفوتوميتر الامتصاص الذري

تواتر الصيانة : مرة كل_____شهر

dd/mm/yyyy :

4) صيانة الحراق
- قم بتنظيف رأس الحراق
- قم تنظيف المرذذ و الخرطوم (يجب تغير الخرطوم في حال الحاجة لذلك)
- قم بتنظيف الحجرة

5) صيانة الفرن
- قم بتنظيف الغطاء الغرافيتي و الحامل و مقابس صفيحة النافذة و صفائح النافذة
- قم بتنظيف حساس الحرارة
- قم بتنظيف آلية الإنزلاق
- قم بتنظيف الجوان

6) ضبط موقع المذري
- ضبط موقع الحراق
- ضبط موقع الفرن

7) تغير لمبة الديتيريوم في حال الحاجة لذلك

8) الصيانة بإتباع تقرير إكمال التركيب القياسي (المعدل)

تقرير إكمال التركيب القياسي

1. دقة طول الموجة

قم بالبحث عن الخط الطيفي عند عرض شق 0.2 نانوميتر و دقق الاختلاف مع الإعدادات باستخدام لمبة مهبطية مفرغة خاصة بالزئبق. استخدم برنامج WizAArd و صفحة "Optics Parameters"، قم بإعادة إعداد طول الموجة و البحث عن الخط الطيفي لكل من الأطوال الموجية الموضحة في الأسفل.

الخطأ	القيمة المقاسة	طول الموجة
nm	nm	253.7 nm
nm	nm	365.0 nm
nm	nm	435.8 nm
nm	nm	546.1 nm

(يجب أن يكون الخطأ يساوي أو أقل من 0.30 ± نانوميتر)

2. حساسية الامتصاص (اللهب)

قم بحقن الماء المقطر (معايرة الصفر بواسطة الماء) وستاندر 2 Cu ppm داخل اللهب بالترتيب. ثم قم بالقياس خمس مرات متتالية. قم بأخذ المتوسط للقيمة المقاسة.

- المعيار

طول الموجة: 324.8 نانوميتر

عرض الشق: 0.5 نانوميتر

الزمن ما قبل الترذيذ: 1 ثانية

الزمن الكلي: 3 ثانية

متوسط الامتصاصية	Abs

(Abs0.2300 أو أكثر)

3. التكرارية (اللهب)

تحقق من RSD% حسب البيانات الواردة في البند 2.

%	% RSD

(2.00% أو أقل)

4. تقلب القراءة (اللهب)

تحقق من تقلب القراءة عند حقن ستاندر 2Cu ppm لمدة 30 ثانية.

- المعيار

طول الموجة: 324.8 نانوميتر

عرض الشق: 0.5 نانوميتر

الزمن ما قبل الترذيذ: 3 ثانية

الزمن الكلي: 30 ثانية

قم بتكبير الخط المعبر عن القمم في نافذة الحاسب. قم بقراءة الضجيج باستخدام المؤشر.

%	التقلب

(7.0% أو أقل)

5. حساسية الامتصاص (الفرن)

قم بحقن محلول ستاندر Mn 1 ppb بكمية 20 ميكروميلي و قم بالقياس خمس مرات متتالية. ثم قم بأخذ المتوسط للقيم المقاسة.

- المعيار

طول الموجة:279.5 نانوميتر
عرض الشق: 0.2 نانوميتر

متوسط الامتصاصية	Abs

(0.1500 Abs أو أكبر)

6. التكرارية (اللهب)

تحقق من RSD% حسب البيانات الواردة في البند 5.

% RSD	%

(2.50% أو أقل)

7. التحقق من آلية السلامة (اللهب)

تحقق من عمل آلية السلامة (اللهب):

(1) فحص تسريب الغاز
(2) عمل مؤشر ضغط الغاز
(3) عمل مراقب اللهب
(4) عمل حساس التصريف
(5) التحقق من تركيب المرذذ و الوصلة

8. التحقق من آلية السلامة (اللهب)

تحقق من عمل آلية السلامة (اللهب):

(1) عمل مراقب ماء التبريد
(2) عمل مؤشر ضغط الغاز
(3) عمل حماية الدارة

Operation and Maintenance Manual for Metal Analysis (O/M Manual)-8 Concentration with Calibration Curves and Dilution

1. Calibration Curve

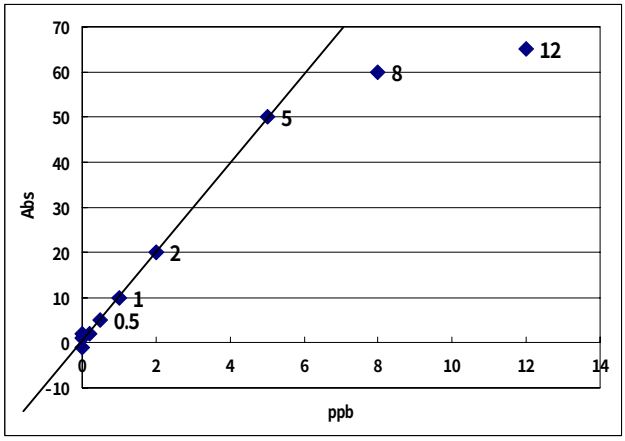
1) Minimum Value to be measured

Here you have a calibration curve (CC) for a material "A" consisting of concentrations such as 0, 0.5, 1, 2, 5 (ppb), then material A's quantitative limit is 0.5ppb because it is the minimum value of the CC that you have checked its CV and made sure it has been able to be measured (this is not a common idea, but it is in the DAM DFEA's Lab).

2) Maximum Value to be measured

On the other hand, what value is the maximum to be measured? The answer 5ppb is correct in some cases but it is not correct all the time because you can measure more than 5ppb by diluting samples in advance.

If the CC lasts in a liner line for ever, we can finish measurement no matter how high the concentration is. But usually CC remains as a line within a limited range (see the figure below, in this case, only the range of 0.5-5ppb is linear). In this case of the figure below, you can not get the right concentration when you measure 8ppb. With the CC of 0.5-5ppb will give out about 6ppb only because the Abs should be 60 for 8ppb. This is the reason why we have to dilute samples and measure until the Abs (or concentration) gets in the range of the CC.



2. Dilution

1) Necessity of Dilution

Dilution of samples is not necessary only after measurements when they are beyond the maximum calibration but also in advance of measurements when samples seem to contain materials with high concentrations. Because we handle samples with high concentrations of organic and/or inorganic materials, it is better to treat them after dilution to preserve apparatus and instruments without contamination.

In the case of dilution, we have to know how many times to dilute samples. That is the matter of Quantitation Limit (QL) and how low concentrations we need to measure.

For the material "A", the QL is 0.5ppb. And for example, if the standard of drinking water for "A" is 5ppb and we were supposed to measure at that level, we can dilute samples 10 times. When one result is 0.5ppb, the actual concentration is 5ppb, and when another result is <0.5ppb, the value for reporting will be <5ppb.

2) Practical lessons

Consider how many times the samples can be

diluted in the following cases when the minimum levels for reporting are the same as the standards for drinking water.

1) When Al's QL is 5ppb and the standard for drinking water is 0.2ppm, how many times can the sample be diluted?
2) When As's QL is 5ppb and the standard for drinking water is 0.01ppm, how many times can the sample be diluted?
3) Sample "X" consumes much amount of $KMnO_4$ when it is pretreated for Hg. What measure is to be taken when Hg's QL is 0.5ppb and the standard for drinking water is 0.001ppm?

التركيز مع منحنيات المعايرة و التمديد

كوجي كيمورا- فريق خبراء جايكا

2. التمديد

1) ضرورة التمديد

ليس تمديد العينات ضرورياً فقط بعد القياسات عندما تتجاوز قيمها الحد الأعلى لمنحني المعايرة بل ضروريا أيضاً قبل القياسات عندما يبدو على العينات أنها تحتوي مواد بتراكيز عالية. بما أننا نتعامل مع عينات ذات تراكيز عالية من المواد العضوية و غير العضوية لذا يفضل التعامل معها بعد التمديد لحفظ الأدوات و الأجهزة من أي تلوث.

عند التمديد يجب علينا أن نعرف كم مرة يجب تمديد العينات. تتعلق هذه المسألة بالحد الكمي و مقدار صغر التراكيز التي نريد قياسها.

من أجل المادة "A" فإن الحد الكمي هو 0.5ppb. و على سبيل المثال في حال كان ستاندر مياه الشرب ل "A" هو 5ppb و يتوجب علينا القياس عند هذا الحد يمكننا أن نمدد العينة 10 مرات.

عندما نحصل على نتيجة 0.5ppb فإن التركيز الفعلي هو 5ppb و عندما نحصل على نتيجة أخرى أصغر من 0.5ppb فإن القيمة التي يجب تسجيلها هي <5ppb.

2) دروس عملية

قم بتقدير كم مرة يمكن تمديد العينات في الحالات التالية عندما تكون المستويات الدنيا للنتائج مماثلة لستاندرات مياه الشرب

1- عندما يكون الحد الكمي للألمنيوم هو 5ppb و ستاندر مياه الشرب هو 0.2ppm. كم مرة يمكن تمديد العينة؟

2- عندما يكون الحد الكمي للزرنيخ هو 5ppb و ستاندر مياه الشرب هو 0.01ppm. كم مرة يمكن تمديد العينة؟

3-لدينا عينة "X" تستهلك كمية كبيرة من $KMnO_4$ عندما يتم إجراء المعالجة الأولية لها لقياس الزئبق. ما هو الإجراء الذي يمكن إتخاذه عندما يكون الحد الكمي للزئبق هو 0.5ppb و ستاندر مياه الشرب هو 0.001ppm؟

1. منحني المعايرة

1) أقل قيمة يمكن قياسها

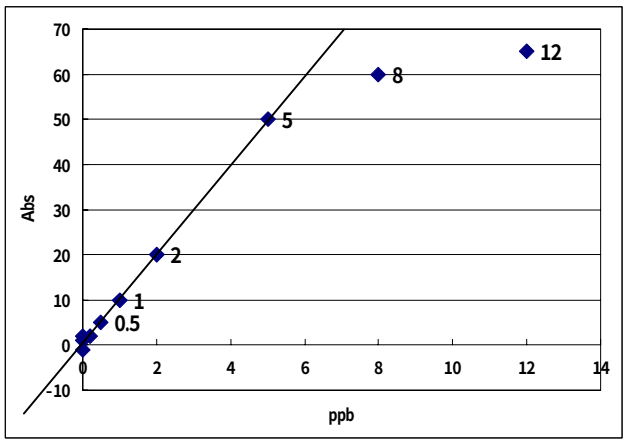
لديك هنا منحني معايرة لمادة ما "A" مكون من عدة تراكيز مثل 0, 0.5, 1, 2, 5 (ppb) . و بالتالي الحد الكمي هو 0.5ppb لأنها أقل قيمة لمنحني المعايرة قمت بفحص ال CV لها و قمت بالتأكد من أنها قابلة للقياس (هذه الفكرة ليس عامة ولكنها فقط في مديرية البيئة في محافظة دمشق).

2) أكبر قيمة يمكن قياسها

على الجانب الأخر فما هي أكبر قيمة يمكن قياسها؟ الإجابة : 5ppb هي القيمة الصحيحة في بعض الحالات لكنها ليست صحيحة دوماً لأنه يمكنك قياس أكثر من 5ppb بتمديد العينة بشكل مسبق.

لو أن منحني المعايرة استمر بشكل خطي فبإمكاننا القيام بالقياس بغض النظر عن ارتفاع التركيز. لكن عادة يبقى منحني المعايرة بشكل خطي ضمن مجال محدد (لاحظ الشكل حيث أن فقط المجال بين 0.5-5ppb هو مجال خطي).

في هذه الحالة لا يمكنك الحصول على القيمة الصحيحة عندما تقوم بقياس تركيز 8ppb. إن منحني المعايرة بين 0.5-5ppb سيعطي فقط تركيز حوالي 6ppb لأن الامتصاصية يجب أن تكون 60 من أجل تركيز 8ppb. هذا هو السبب لتمديد العينات و قياسها حتى نحصل على امتصاصية (أو تركيز) ضمن مجال منحني المعايرة.



Operation and Maintenance Manual for Air Quality Analysis

Basis of Analysis Operation (O/M Manual)-1

Air Quality Analysis

Basis of Analysis Operation

1. Necessity and importance of environmental analysis

1.1 Introduction

Developing countries are currently faced with the difficult task of enhancing economic strength and making infrastructure improvements in cities, while attempting to mitigate pollution and preserve the local and global environment.

Measures are needed to achieve environmental improvements in every economic sector, including residences and transportation sector particularly in urban settings. Experts who are sent to these countries can be quite useful, as they can use their experiences in addressing environmental issues to determine policies and techniques that are feasible and suitable for these countries.

This text provides some basic information that can be presented to people primarily engaged in environmental analysis, to help understand environmental issues and techniques. The primary focus of this text is on techniques for laboratory analysis and water purification, necessary steps for comprehensive environmental monitoring.

1.2 Recognition and characteristics of environmental changes

We are surrounded by a range of environmental settings in different media, including air, water, and soil. Environmental analysis is needed to identify changes in the composition of these media, both qualitatively and quantitatively. We want to think about the characteristics of water pollution and air pollution as shown in the table below.

Characteristic comparison between water pollution and air pollution

Item	Water pollution	Air pollution
Color	It is possible that the color changes depending on factory drainage and/or the existence of organic substances.	Regarding the dust, its fall can be seen but the color doesn't change.
Bad smell	A peculiar odor smell might be originated, and it causes air pollution.	A peculiar odor smell might be originated according to the source
Visible verification of environmental quality	Environmental situation can often be visually understood except for the heavy metals	Heavy metals, such as lead, and gaseous pollutants like NO_x, SO_2, O_x, and VOC can not be realized by visible inspection even if they have large sizes
Pollution recognition	Pollution can be realized by color and smell, therefore it can be often recognized	It is rare that the pollution can be realized by human sensations, therefore, color and smell inspection are not reliable
Pollutants behavior	Water stays easily compared with atmospheric air	Atmospheric air diffuses depending on the meteorological conditions
Environmental impact	In general, the impact is regional	In general, the impact spreads over large area
Influence on human body	Basically, damage depends upon the continuation, period, of intake, and not on age or gender	Air pollution greatly affects old people and children, in addition to weak people
Self-defense	The decision of not drinking or using polluted water **can be made**	The decision of not inhaling polluted air **can not be made**

With respect to environmental measurements of air quality and water quality, measurements start from paying attention to pollution changes over both short period and long period of time.

In order to grasp environmental changes, it is necessary to carry out continuous monitoring of the environment. As environmental analysts, our study of environmental changes can be accompanied by real enjoyment and our motivation should be sincere awareness.

1.3 Analysis in environmental monitoring

1.3.1 Meaning of environmental analysis

As described above, changes in the environment are measured quantitatively in environmental analysis. To help preserve and improve the environment, it is necessary to understand current conditions and trends. Quantitative data can be compared over time, as well as across regions and countries, to help in the development of regulations and policies.

1.3.2 Securing data reliability

Environmental analysis indicates the measuring of the environmental conditions and the evaluation of the measured data. The data may represent an annual change, a regional comparison, and an international comparison. Therefore, data reliability is indispensable.

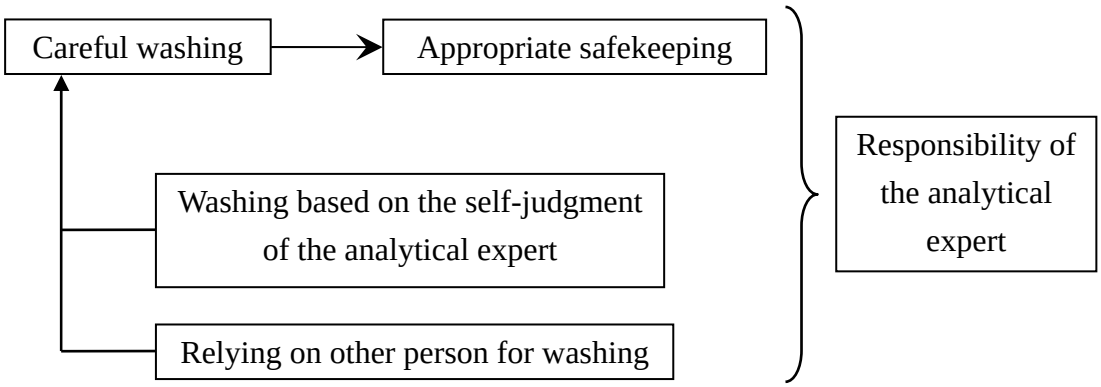
For the sake of evaluating the environmental changes, an environmental analyst must be able to decide on the methodology and parameters, and must balance the trade-offs among different methods. While evaluation by determining multiple parameters may be theoretically desirable, costs and reliability concerns necessitate environmental evaluation using minimum necessary parameters. Clearly, the data collected from the field must be credible.

In many situations, the concentrations of targeted substances are quite small, and cannot be detected unless the basic field work and laboratory work are done correctly. This involves the use of proper devices to measure the specified substance, in addition to a number of other work steps.

The containers holding the samples and the glassware used to extract the specified substances must be clean and stable, and purified water must be used to avoid sample contamination. Despite the importance of this step, little attention is usually devoted to the cleaning of the glassware. Many people wash sample containers like they wash glasses at home. It is also important to address the purity of the water, both in terms of the quality of the water supplied to the water purification system and the resulting purified water.

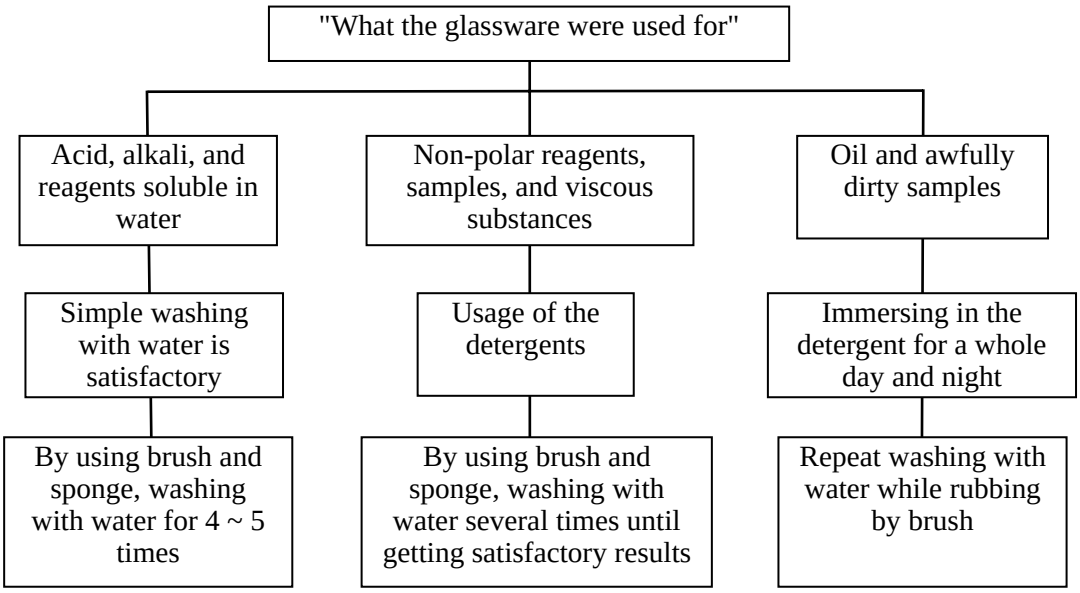
2. Washing and safekeeping of the glassware

The first step in the chemical analysis is washing the glassware (extremely important)



2.1 The method of washing the glassware

Glassware should be washed based on "what they were used for"



- ❖ If possible, wash the glassware immediately after usage.
  (If the glassware are left for long time after usage they become dry, and it would become difficult to remove the substances that might stick on their surfaces).
- ❖ Putting the glassware in the detergent and cleaning with the ultrasonic waves is a good cleaning method.

2.2 The method of drying the glassware

1) When drying by heating, use a drier of glassware exclusive use.
2) Drying by heating can not be used for drying the pipettes and the volumetric flasks.

2.3 The method of glassware safekeeping

1) The best way is the tight seal using locker.

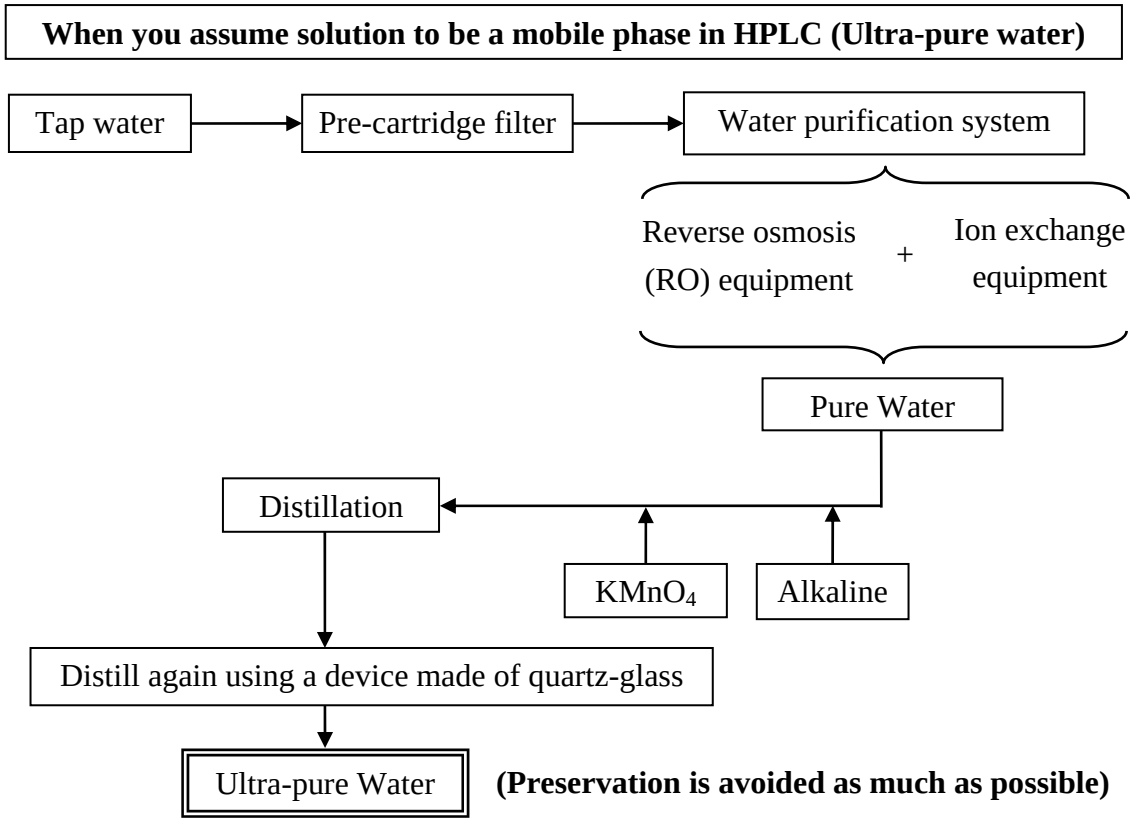
2) Lie the glassware so that its inlet locker is face down and cover it with aluminum foil or rub.
3) Glassware that have been under long time safekeeping should be washed first and then used.

3. Preparation of pure water and Check its purity

3.1 Purification method and characteristics

Treatment method	Removal method	Removal target	Characteristics
1. Reverse osmosis (RO)	Using membrane module	Anion, cation, organic substances	Over 99% of NaCl and almost 100 % of organic substances with molecular weights over 300 can be removed. However, reverse osmosis cannot remove substances with low molecule weights, suspensoids, and dissolved gases such as CO_2.
2. Ultrafiltration	Using membrane module (Hole diameter 1 ~ 10 nm)	Colloidal substances	Removal efficiency is more than 90 ~ 95 %. With respect to the membrane module, Polysulfone, polyacrylonitrile, and Polyethersulfone are used
3. Adsorption	Activated carbon, activated alumina, and molecular sieve	Dissolved giant molecules	Substances and a portion of dissolved inorganic substances, but a short lifespan is numerous.
4. Ion exchange	Using ion exchange resin	Anion and cation	Inside the column, strong acid cation exchange resin and strong alkali anion exchange resin
5. Distillation	Still	Anion, cation, organic substances	There are cases where volatile substances are included within the distilled water. Recently, non-boiling still is being used.
6. Precise filtration	Using giant molecule porous filtration membrane	Colloidal substances	Cellulose acetate, polysulfone, polypropylene, and nylon are used. When placed in the back end of the ion exchange, generally a precise filter element with a hole diameter of 0.2 ~ 0.45 μm is used.
7. Heating		Bacteria and endotoxin	Ultraviolet rays are irradiated to disinfect Legionella.

Note: in order to preserve the quality of the purified water it is important to adopt a proper maintenance management.



3.2 Example of water purification systems

Water purification system should be selected in accordance with the desired degree of purity and the designed water usage quantity. Some examples of commercially available products and the classifications of the purified water quality are shown as follows:

[Classification of water quality]

A1: Used for washing and as a material for higher water degree (A2-A4).

A2: Used for general chemical analysis.

A3: Used for the preparation of reagents and for the microanalysis.

A4: Used for testing organic substances (TOC, COD…etc) and for the microanalysis of organic substances.

The characteristics of each purified water classification are presented in Table 3-1.

Table 3-1 Purified water classification characteristics used for chemical analysis[1)]

Item	Rank			
	A1	A2	A3	A4
Electric conductivity mS/m (25 ºC)	under 0.5	under 0.1	under 0.1	under 0.1
Total Organic Carbon (TOC) [mgC/L]	under 1.0	under 0.5	under 0.2	under 0.05
Zinc [μgZn/L]	under 0.5	under 0.5	under 0.1	under 0.1
Silica [μgSiO2/L]	-	under 50	under 5.0	under 2.5
Chloride ion [μgCl－/L]	under 10	under 2	under 1	under 1
Sulfate ion [μgSO42－/L]	under 10	under 2	under 1	under 1

1) JIS K 0557 (1998) Water used for industrial water and wastewater analysis

(1) Example 1

Raw water → activated carbon filter → ion exchange resin (A2) → distillation → water storage tank (A3)

(2) Example 2

Raw water → activated carbon filter → ion exchange resin → distillation (A3) → high purity ion exchange resin → membrane filter (A3)

(3) Example 3

Raw water → raw water filtration → distillation → water storage tank (A3) → high purity ion exchange resin → membrane filter (A3)

(4) Example 4 (ultra-pure water producing system)

Treated water → activated carbon filter → high purity ion exchange resin → high purity ion exchange resin → infinitesimal impurity removal by resin → membrane filter (A4)

(5) Example 5 (cartridge water purification equipment (cartridge water deionizer))

Raw water → ion exchange resin → qualified water sample (A1)

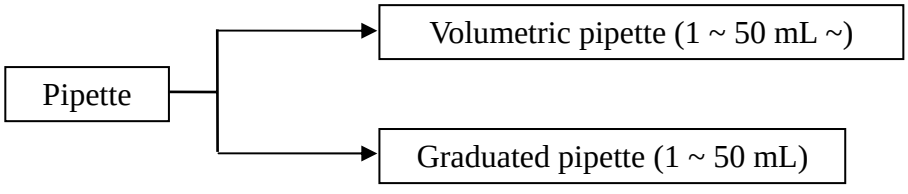
(6) Example 6

Raw water → Prograd pre-treatment → Reverse osmosis (RO) membrane → continual ion exchange EDI module (A3)

4. Preparation for diluting standard solutions

4.1 The way of handling the pipette

(1) Types of pipette



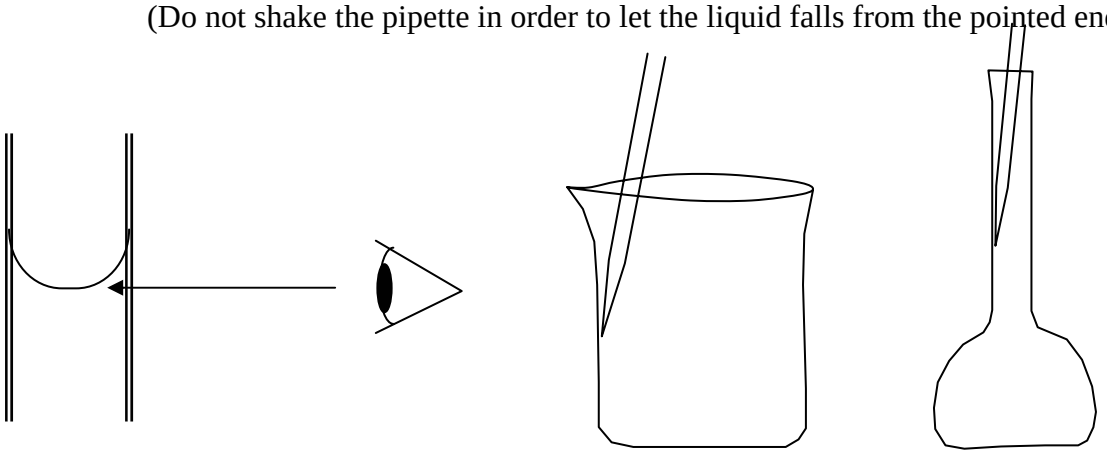
- These scales show the volume of water at 20 ºC.
- There are two grades of allowance (margin of error); A and B.
- In general, the pipette has the mark "TD" (To Deliver) ("Ex" has the same meaning of “withdraw uses”)

  (The desired amount of a liquid it is not the volume of the liquid sucked with the pipette until the marked line, instead, it is the quantity of the liquid that is poured into a container, beaker for example. In other words, it is not necessary to drop by force the stuck liquid at the inner wall of the pipette)

(2) The way of Withdrawing liquid by using the pipette

1. Insert the pointed end of the pipette deeply inside the liquid. (Care should be taken to prevent liquid from entering the pipetter).
2. Wash the internal of the pipette twice with the collected liquid.
3. Close the upper end of the pipette with your finger, and adjust the volume to the marked line.

   (Do not shake the pipette in order to let the liquid falls from the pointed end).



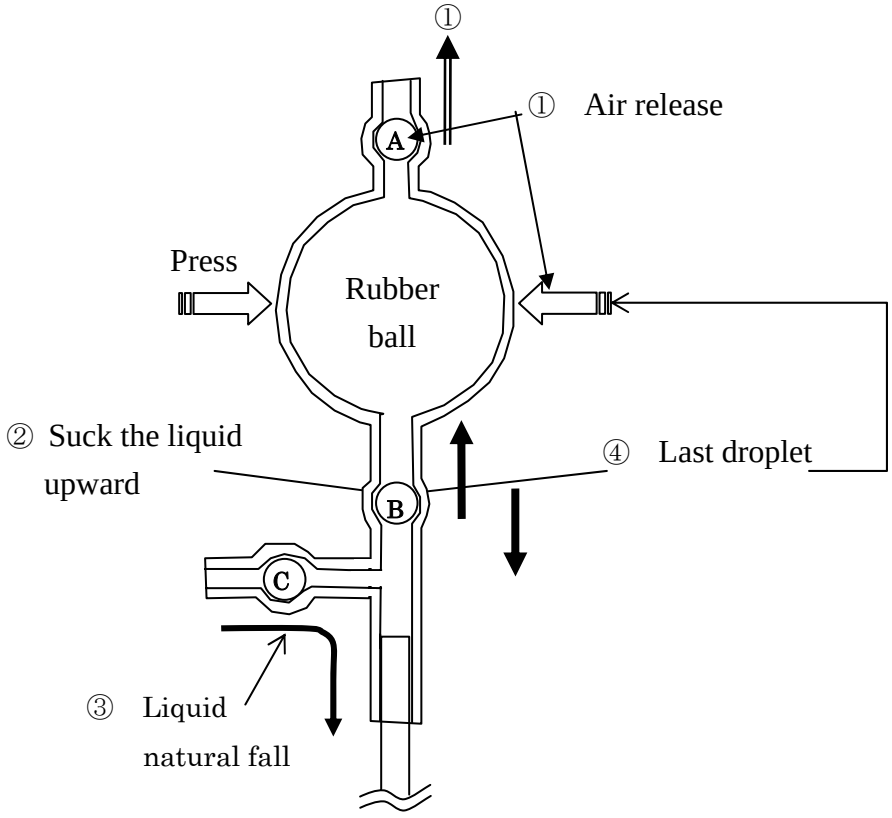
4. Place the pointed end of the pipette on the inner wall of the volumetric flask. Then, release your finger to empty the liquid into the flask.
5. After all of the solution has been emptied into the flask, keep the pipette in this position for about 10 seconds. You should not blow air inside the pipette to make the liquid drop more quickly.
6. To allow the last droplet to drop press again the upper end with your finger, and grip the swelling part of the pipette with the palm of your hand so that it is heated with your body temperature and, therefore, the liquid completely outflows.

(3) Pipetter

- **It is necessary** to use the pipetter for the followings substances: Volatile liquids, acid, alkali, dangerous chemicals.

- **It is not necessary** to use the pipetter for the following substances: safe water solutions.

1. Press A while pressing the rubber ball.
2. Insert the pipette deeply into the liquid, and press B to suck the liquid upward.
3. To adjust the liquid level at the marked line, press C to allow few droplets of liquid to fall naturally into the flask.
4. Wait for about 10 seconds, and press the rubber ball then press B while keeping the rubber ball pressed.



Tools and Materials Management (O/M)

(Air Quality Analysis)

Management number	Equipment, Tools and Materials	Maker	Type	Date of purchase	Keeping room name	Management representative	Regular management (Normality, repair or exchange)					
							/	/	/	/	/	/
1	Air Quality Analysis Equipment and Instrument											
2	TSP High Volume Air Sampler	Atomic Energy Commission, Syria	HVAS 1									
3	PM10 High Volume Air Sampler	Pacwil Environmental	TE-6070D									
4	Low Volume Air Sampler	Ingenieurburo Schulze Automation	ISAP 1050 GG2.3									
5	Handy Sampler	Kimoto	HS-7									
6	Dust jar	ALBA	Syrian tipe									
7	Simple Sampler for air quality monitoring	Ogawa	OG-SN-S									
	Meteorological instrument	Global Water										
1	Wind Direction Meter	Global Water	WE 550									
2	Wind Speed Meter	Global Water	WE 570									
3	Thermometer	Global Water	WE 700									
4	Hygrometer	Global Water	WE 600									
5	Solar radiation meter	Global Water	WE 300									
6	Data Logger	Global Water	GL500									
7	Asman ventilation psychrometer	Adolf Thies (Germany)	-10 to +60 deg. C									
	Laboratory Equipment											
1	Micro Balance	Boeco	BBL31									
2	Refrigerator											
3	Locker for reagents	ALBA	Syrian tipe									
4	UV/VIS Spectrometer	Biotech Engineering	Spectroscan 50									
5	Vacuum Pump											
6	Doraing Shelf (for the glass apparatus)	Technical & Lab.	Syrian tipe									
7	Auto-dry desiccators	ALBA	Germany	Nov. 2007								
8	Digital balance	Germany	serie Ge	Feb. 2007								
9	Drying oven	Analytik Jena	Germany									

Maintenance record tables of glasswares (1)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Whole Pipettes	Glass, 1 ml	3								
		Glass, 2 ml	3								
		Glass, 5 ml	5	Aug. 6, 2006							
		Glass, 10 ml	5								
		Glass, 20 ml	3								
		Glass, 50 ml	2								
	Graduated pipettes	Glass, 1 ml	2								
		Glass, 5 ml	3								
		Glass, 10 ml	4								
	Pipette Fillers	Applicable pipette's capacity: not more than 2mL	1								
	(Rubber Pippeter)	Capacity: 25mL	2								
	Ceramic mortar	Size: 110-130mm	1								
	Beakers	50 ml, Glass, Color: clear	2								
		100 ml, Glass, Color: clear	10								
		250 ml, Glass, Color: clear	10								
		400 ml, Glass, Color: clear	2								
		600 ml, Glass, Color: clear	5								
		1000 ml, Glass, Color: clear	2								
		2000 ml, Glass, Color: clear	1								
	Volumetric Flasks	25 ml, Color: clear, joint and poly stopper	2								
		50 ml , Color: clear, joint and poly stopper	2								
		100 ml ,Color: clear, joint and poly stopper	10	Aug. 6, 2006							
		200 ml Color: clear, joint and poly stopper	2								
		500 ml , Color: clear, joint and poly stopper	2								
		1000 ml , Color: clear, joint and poly stopper	1								
	Erlenmeyer Flasks	100 ml, Borosilicate glass, color: clear	5								
		250 ml, Borosilicate glass, color: clear	5								
		300 ml, Borosilicate glass, color: clear	5								
		500 ml, Borosilicate glass, color: clear	2								
		1000 ml, Borosilicate glass, color: clear	1								
	Erlenmeyer Flasks with Ground Joints	100 ml, Borosilicate glass, color: clear	5								
		250 ml, Borosilicate glass, color: clear	5								
		300 ml, Borosilicate glass, color: clear	5								
		500 ml, Borosilicate glass, color: clear	2								
Check person											

Maintenance record tables of glasswares (2)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Graduated Cylinders	50 ml, Borosilicate glass, A B class, Color: clear	2								
		100 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		250 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		500 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2								
		1000 ml, Borosilicate glass, ~~A~~ B class, Color: clear	1								
	Watch Dish	φ65-75mm	2	Aug. 6, 2006							
		φ90-100mm	2								
		φ125mm	2								
		φ150mm	2								
		φ180-200mm	2								
	Wash Bottles	Capacity: 500 ml, Polypropylene	3								
		Capacity: 1000 ml, Polypropylene	3								
	Beaker with handle	Capacity: 1000 ml, Polypropylene	1								
	Test Tube with stopper	Test tube, 18(dia.) x 180 (L) mm $16, 100 pcs/case	1	Aug. 6, 2006							
	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	1								
	Funnels	Soda-lime glass, Angle: 60°, with short stem, φ70 mm	5								
		Soda-lime glass, Angle: 60°, with short stem, φ100 mm	5								
	Glass rods	Glass rods, 750 (L) x 5(dia.)mm	2								
		Glass rods, 750 (L) x 8(dia.)mm	2								
	Glass tube	Glass tube, 750 (L) x φ6×φ8mm	2								
	Stoppcock	Stoppcok, φ6×φ8mm, Fluoroplastic (PTFE) or equivalent, Temperature resistant	1	Aug. 6, 2006							
	Pinchcok	Pinchcok (Size M), Stainless steel	5								
	Screw Cock	Screw Cock (Size M), Stainless steel	5								
	Stopwatch	Manual rolling	1								
	Micro pipet	2～20 μl	1								
		10～100 μl	1	Aug. 6, 2006							
	Chip for micro pipet	0.5～10 μl, 1000 pcs/package	1								
		2～200 μl, 1000 pcs/package	1								
	Thermometer	Mercury type cylinder shape thermometer, -20～100℃	2								
	Beaker tongs	Tongs for flask	1								
	Cork borer	Cork borer sets saw-shaped edge (No. of borers, 12)	1	Aug. 6, 2006							
	Muff	Clamp Holders, Horizontal stick	10								
	Jumbo muff	Clamp Holders, Horizontal stick	5								
Check person											

Maintenance record tables of glasswares (3)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Clamps	Open diameter: 5～50 mm	5								
		Open diameter: 5～80 mm	5								
	Tweezers	Odontology department tweezers	2	Aug. 6, 2006							
	Vacuum hose	Vacuum hose φ8×φ21mm (5 m/ Unit)	1								
	Rubber tube	Rubber tube φ6×φ9mm (10 m/ Unit)	1								
	Silicon rubber tube	Silicon rubber tube 'φ6×φ9mm, (10m/ Unit)	2								
	Silicon rubber tube	Silicon rubber tube 'φ8×φ10mm, (10m/ Unit)	1	Aug. 6, 2006							
	Tube joint	Straight, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
		T type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
		Y type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1								
	Support for test tubes	for 18(dia.) x 180 (L) test tube, Number of partitions: 5×10	1								
	Weighing Paper	Weighing Paper 500pcs/box, Large (Size: approx. 120 x 120 mm)	1								
		Weighing Paper 500pcs/box, Small (Size: approx. 90 x 90 mm)	1								
	Vacuum Pump	Capacity: 1.08-1.3 liter/min, Ultimate vacuum: 440mmHg	1	Aug. 6, 2006							
	Glass fiber filter paper*1	φ50 mm, 100 pcs (Low gas absorption type) for Air Sampling	2								
	Quartz fiber filter paper*1	8'×10', 25 pcs	1								
	Glass fiber filter paper*1	8'×10', 100 pcs	2								
	Membrane filter	0.45μm, φ47 mm, 100 pcs cellulose	2	Aug. 6, 2006							
	pH Paper	pH paper: Roll type, 4 pcs/case	2								
	Pipet container	Applox. 450 (W) × 300 (D)) × 70 (H) mm	1								
	Pipet support	Plastic or more fine quality, Size: Approx. 200×170×250 (H) mm, H tipe	1	Aug. 6, 2006							
	Stand for micro pipet	Number of sets of syringes : 5-6 psc	1								
	Waste water container	Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 20 L, Color: White, Stopper: Two	8								
		Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 5 L, Color: White, Stopper: One	8								
	Flask filtering	1000 ml, Borosilicate glass	1								
	Seal tape	Made of teflon, Applox. 10mm× 15 m	2	Aug. 6, 2006							
	Paraffin film	4" × 125 feet	2								
	Pipet cleaner	Inside size of basket: Approx. 500×φ136 mm	1								
Check person											

Maintenance record tables of glasswares (4)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity							
				Delivery	/	/	/	/	/	/	/
	Brush	For bottle washing (small: No2)	2								
		For bottle washing (middle: No5)	2								
		For bottle washing (large: No10)	2								
		For Pipettes	2								
	Color comparition tubes	50 ml, with white graduated, With stopping	10								
	Color comparition tubes	100 ml, 2 ring marks, Cylinder. Tall form, Germany	4	Aug. 6, 2006							
	Tube support	For color comparition, For 100ml color comparition tube ×10 pcs	1								
	Pasteur Pipette	150 mm, 1000 pcs, Borosilicate	1								
		230 mm, 1000 pcs, Borosilicate	1								
	Dropping Bottle	50 ml	2								
		100 ml	1								
	Crucible	Crucible, porcelain, 38 ml	10								
		Crucible, porcelain, 50ml	10								
	Porcelain dish tongs	Porcelain dish tongs	1								
	Standard Sieve	Applox. Φ200 mm, mesh: 2mm	1								
	Weighning Bottle	Applox. φ50mm, H35mm	5								
	Desiccator	Desiccator, glass, 180mm (dia.)	1								
	Conical beaker	250 ml	10								
	Bottle for sample collection	1000 ml, Polypropylene, with screw closure, Wide-mouse bottle,	20	Aug. 6, 2006							
	Rubber Bulb for Small Pipette	Vinyl-methyl Silicon rubber for graduated pipettes (1ml)	2								
		Vinyl-methyl Silicon rubber for graduated pipettes (5ml)	2								
	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	2								
	Cleaning Tissue	45 boxes of 200 tissues	1								
	Goggles	Plastic, with side guard	2								
	Cleaning Agent	For removing grease, oil, wax, dye residue, silicone, etc. Volume: 2 liters	1								
	Burret	Burret 25 ml , Color: clear	2								
		Burret 50 ml , Color: clear	2								
	Burret stand	Double holder	1								
Check person											

Record of usage condition for reagent (1)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

Management No.	Name	Specifications			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
1	Acetic acid (CH_3COOH)	NO2	G	2.5 L	1	Aug. 6, 2006									
2	Sulfanilic acid ($H_2NC_5H_4SO_3H$)	NO2	G	100g	1										
3	*N*-(1-Naphthyl) ethylenediamine dihydrochloride For NOx analysis ($C10H7NHCH2CH2NH2 \cdot 2H2O$)	NO2	—	25g	1	Aug. 23, 2006									
4	Potassium permanganate For NOx analysis ($KMnO_4$)	NO2	—	1 kg	1	Aug. 6, 2006									
5	Sulfuric acid (H_2SO_4)	NO2, F	G	2.5 L	1	July 2006									
6	Sodium nitrite ($NaNO_2$)	NO2	G	500g	1	Aug. 6, 2006									
7	Chloroform, certified ($CHCl_3$)	NO2	UGR	2.5 L	1										
8	Barium hydroxide octahydrat ($Ba(OH)_2 \cdot 8H_2O$)	NO2	G	500g	1										
9	Triethanol amine ($N(CH_2CH_2OH)_3$)	NO2	G	500ml	1										
10	Sodium azide (NaN_3)	SO2	G	100g	1	Aug. 6, 2006									
12	Hydroclolic acid (HCL)	SO2	G	2.5 L	1										
13	Formaldehyde	SO2	G	2.5 L	1										
14	Sodium hydrogen sulfite 40% Solution (NaHSO3)	SO2	G	1.0L	1										
15	Iodine (0.1 N)	SO2,Ox	—	500ml	1										
16	Sodium sulfate (Na_2SO_4)	SO2	G	500g	1										
17	Mercury (II) chloride ($HgCL_2$)	SO2	G	500g	1										
18	Sodium chloride (NaCL)	SO2	G	1 kg	1										
19	Glycerin ($HOCH_2CHOHCH_2OH$)	SO2	G	1 L	2										
20	Starch, soluble ($(C_6H_{10}O_5)n$)	SO2,Ox	1	1 kg	1										
21	Mercury (II) iodide, red (HgI_2)	SO2	G	100g	1										
22	Sodium thiosulfate pentahydrate ($Na_2S_2O_3 \cdot 5H_2O$)	SO2,Ox	Semi-G	1 kg	1										
23	Potassium iodate (KIO_3)	SO2	G	100g	1	July 2006									
24	Potassium iodide (KI)	SO2	G	1 kg	1										
25	Hydrochloric acid (1 N) (1N-HCL)	SO2	G	1 L	1	Aug. 6, 2006									
26	Sodium fluorid (NaF)	F	G	500g	1										
27	Lanthanum nitrate hexahydrate (La(NO3)3・6H2O)	F	Semi-G	25g	1										
28	Alizarin complexone dihidrate, indicator grade ($C19H15NO8 \cdot 2H2O$)	F	—	1g	1	Aug. 23, 2006									
29	Silicon dioxide (SiO2)	F	G	500g	1	Aug. 6, 2006									
30	Fhosphoric acid (H3PO4)	F	G	2.5L	1										
31	Phenolphthalein ($C20H14O4$)	F	G	100g	1										
32	Perchloric acid (HCLO4)	F	G	1 L	1	July 2006									
33	Sodium hydroxide, pellets (NaOH)	F	G	1 kg	1										
Check person															

Record of usage condition for reagent (2)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	Name	Specifications			Q'ty	Date of	Expiration	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total	Delivery	date for use	/	/	/	/	/	/	/	/
34	Ammonia solution, 25% (NH4OH)	F	G	2.5 L	1	Aug. 6, 2006									
35	Ammonium acetate, >98% (CH3COONH4)	F	Semi-G	500g	1										
36	Sodium acetate, trihydrate	F	G	500g	1										
37	Acetone	F	G	2.5 L	2										
38	Potassium dihydrogenephosphat (KH2PO4)	Ox	―	500g	1										
39	Disodium hydrogen phosphate-12water (Na2HPO4・12H2O)	Ox	G	1 kg	1										
40	Potassium iodide (KI)	Ox	G	1 kg	1	July 2006									
41	Iodine (I)	Ox, SO2	G	500g	1	Aug. 6, 2006									
42	Nessler's reagent	NH3	-	500ml	1										
43	Methylene blue	H2S	G	100g	1										
44	Phosphoric Acid (H3PO4)	NO2	G	2.5 L	1										
45	Sulfanilamide	NO2	G	500g	1										
Check person															

Record of usage condition for reagent (3)

Check the residue quantity of the reagent four times a year.
The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	**Name**	**Specifications**			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
Check person															

Maintenance record table of glasswares (1)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Whole Pipettes	Glass, 1 ml	3	Aug. 20, 2006								
		Glass, 2 ml	3									
		Glass, 5 ml	5									
		Glass, 10 ml	5									
		Glass, 20 ml	3									
		Glass, 50 ml	2									
	Graduated pipettes	Glass, 1 ml	2									
		Glass, 5 ml	3									
		Glass, 10 ml	4									
	Pipette Fillers (Rubber Pippeter)	Applicable pipette's capacity: not more than 2mL	1	Aug. 20, 2006								
		Capacity: 25mL	2									
	Ceramic mortar	Size: 110-130mm	1									
	Beakers	50 ml, Glass, Color: clear	2									
		100 ml, Glass, Color: clear	10									
		250 ml, Glass, Color: clear	10									
		400 ml, Glass, Color: clear	2									
		600 ml, Glass, Color: clear	5									
		1000 ml, Glass, Color: clear	2									
		2000 ml, Glass, Color: clear	1									
	Volumetric Flasks	25 ml, Color: clear, joint and poly stopper	2									
		50 ml , Color: clear, joint and poly stopper	4									
		100 ml ,Color: clear, joint and poly stopper	10									
		200 ml Color: clear, joint and poly stopper	2									
		500 ml , Color: clear, joint and poly stopper	2									
		1000 ml , Color: clear, joint and poly stopper	1									
	Erlenmeyer Flasks	100 ml, Borosilicate glass, color: clear	5									
		250 ml, Borosilicate glass, color: clear	5									
		300 ml, Borosilicate glass, color: clear	5									
		500 ml, Borosilicate glass, color: clear	2									
		1000 ml, Borosilicate glass, color: clear	1									
	Erlenmeyer Flasks with Ground Joints	100 ml, Borosilicate glass, color: clear	5									
		250 ml, Borosilicate glass, color: clear	5									
		300 ml, Borosilicate glass, color: clear	5									
		500 ml, Borosilicate glass, color: clear	2									
Check person												

Maintenance record table of glasswares (2)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Graduated Cylinders	50 ml, Borosilicate glass, A B class, Color: clear	2									
		100 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		250 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		500 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		1000 ml, Borosilicate glass, ~~A~~ B class, Color: clear	1									
	Watch Dish	φ65-75mm	2	Aug. 20, 2006								
		φ90-100mm	2									
		φ125mm	2									
		φ150mm	2									
		φ180-200mm	2									
	Wash Bottles	Capacity: 500 ml, Polypropylene	3									
		Capacity: 1000 ml, Polypropylene	3									
	Beaker with handle	Capacity: 1000 ml, Polypropylene	1									
	Test Tube with stopper	Test tube, 18(dia.) x 180 (L) mm $16, 100 pcs/case	1	Aug. 20, 2006								
	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	1									
	Funnels	Soda-lime glass, Angle: 60°, with short stem, φ70 mm	5									
		Soda-lime glass, Angle: 60°, with short stem, φ100 mm	5									
	Glass rods	Glass rods, 750 (L) x 5(dia.)mm	2									
		Glass rods, 750 (L) x 8(dia.)mm	2									
	Glass tube	Glass tube, 750 (L) x φ6×φ8mm	2									
	Stoppcock	Stoppcok, φ6×φ8mm, Fluoroplastic (PTFE) or equivalent, Temperature resistant	1	Aug. 20, 2006								
	Pinchcok	Pinchcok (Size M), Stainless steel	5									
	Screw Cock	Screw Cock (Size M), Stainless steel	5									
	Stopwatch	Manual rolling	1									
	Micro pipet	2～20 μl	1									
		10～100 μl	1	Aug. 20, 2006								
	Chip for micro pipet	0.5～10 μl, 1000 pcs/package	1									
		2～200 μl, 1000 pcs/package	1									
	Thermometer	Mercury type cylinder shape thermometer, -20～100℃	2									
	Beaker tongs	Tongs for flask	1									
	Cork borer	Cork borer sets saw-shaped edge (No. of borers, 12)	1	Aug. 20, 2006								
	Muff	Clamp Holders, Horizontal stick	10									
	Jumbo muff	Clamp Holders, Horizontal stick	5									
Check person												

Maintenance record table of glasswares (3)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Clamps	Open diameter: 5～50 mm	5									
		Open diameter: 5～80 mm	5									
	Tweezers	Odontology department tweezers	2	Aug. 20, 2006								
	Vacuum hose	Vacuum hose φ8×φ21mm (5 m/ Unit)	1									
	Rubber tube	Rubber tube φ6×φ9mm (10 m/ Unit)	1									
	Silicon rubber tube	Silicon rubber tube 'φ6×φ9mm, (10m/ Unit)	2									
	Silicon rubber tube	Silicon rubber tube 'φ8×φ10mm, (10m/ Unit)	1	Aug. 20, 2006								
	Tube joint	Straight, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
		T type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
		Y type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
	Support for test tubes	for 18(dia.) x 180 (L) test tube, Number of partitions: 5×10	1									
	Weighing Paper	Weighing Paper 500pcs/box, Large (Size: approx. 120 x 120 mm)	1									
		Weighing Paper 500pcs/box, Small (Size: approx. 90 x 90 mm)	1									
	Vacuum Pump	Capacity: 1.08-1.3 liter/min, Ultimate vacuum: 440mmHg	1	Aug. 20, 2006								
	Glass fiber filter paper*1	φ50 mm, 100 pcs (Low gas absorption type) for Air Sampling	2									
	Quartz fiber filter paper*1	8'×10', 25 pcs	1									
	Glass fiber filter paper*1	8'×10', 100 pcs	2									
	Membrane filter	0.45μm, φ47 mm, 100 pcs cellulose	2	Aug. 20, 2006								
	pH Paper	pH paper: Roll type, 4 pcs/case	2									
	Pipet container	Applox. 450 (W) × 300 (D)) × 70 (H) mm	1									
	Pipet support	Plastic or more fine quality, Size: Approx. 200×170×250 (H) mm, H tipe	1	Aug. 20, 2006								
	Stand for micro pipet	Number of sets of syringes : 5-6 psc	1									
	Waste water container	Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 20 L, Color: White, Stopper: Two	8									
		Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 5 L, Color: White, Stopper: One	8									
	Flask filtering	1000 ml, Borosilicate glass	1									
	Seal tape	Made of teflon, Applox. 10mm× 15 m	2	Aug. 20, 2006								
	Paraffin film	4" × 125 feet	2									
	Pipet cleaner	Inside size of basket: Approx. 500×φ136 mm	1									
Check person												

Maintenance record table of glasswares (4)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Brush	For bottle washing (small: No2)	2									
		For bottle washing (middle: No5)	2									
		For bottle washing (large: No10)	2									
		For Pipettes	2									
	Color comparition tubes	50 ml, with white graduated, With stopping	10									
	Color comparition tubes	100 ml, 2 ring marks, Cylinder. Tall form, Germany	4	Aug. 20, 2006								
	Tube support	For color comparition, For 100ml color comparition tube ×10 pcs	1									
	Pasteur Pipette	150 mm, 1000 pcs, Borosilicate	1									
		230 mm, 1000 pcs, Borosilicate	1									
	Dropping Bottle	50 ml	2									
		100 ml	1									
	Crucible	Crucible, porcelain, 38 ml	10									
		Crucible, porcelain, 50ml	10									
	Porcelain dish tongs	Porcelain dish tongs	1									
	Standard Sieve	Applox. Φ200 mm, mesh: 2mm	1									
	Weighning Bottle	Applox. φ50mm, H35mm	5									
	Desiccator	Desiccator, glass, 180mm (dia.)	1									
	Conical beaker	250 ml	10									
	Bottle for sample collection	1000 ml, Polypropylene, with screw closure, Wide-mouse bottle,	20	Aug. 20, 2006								
	Rubber Bulb for Small Pipette	Vinyl-methyl Silicon rubber for graduated pipettes (1ml)	2									
		Vinyl-methyl Silicon rubber for graduated pipettes (5ml)	2									
	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	2	Aug. 20, 2006								
	Cleaning Tissue	45 boxes of 200 tissues	1									
	Goggles	Plastic, with side guard	2									
	Cleaning Agent	For removing grease, oil, wax, dye residue, silicone, etc. Volume: 2 liters	1									
	Burret	Burret 25 ml , Color: clear	2									
		Burret 50 ml , Color: clear	2									
	Burret stand	Double holder	1									
Check person												

Record of usage condition for reagent (1)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

Management No.	Name	Specifications			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
1	Acetic acid (CH_3COOH)	NO2	G	2.5 L	1	Aug. 6, 2006									
2	Sulfanilic acid ($H_2NC_5H_4SO_3H$)	NO2	G	100g	1										
3	*N*-(1-Naphthyl) ethylenediamine dihydrochloride For NOx analysis (C10H7NHCH2CH2NH2・2H2O)	NO2	—	25g	1	Aug. 23, 2006									
4	Potassium permanganate For NOx analysis ($KMnO_4$)	NO2	—	1 kg	1	Aug. 6, 2006									
5	Sulfuric acid (H_2SO_4)	NO2, F	G	2.5 L	1	July 2006									
6	Sodium nitrite ($NaNO_2$)	NO2	G	500g	1	Aug. 6, 2006									
7	Chloroform, certified ($CHCl_3$)	NO2	UGR	2.5 L	1										
8	Barium hydroxide octahydrat ($Ba(OH)_2・8H_2O$)	NO2	G	500g	1										
9	Triethanol amine ($N(CH_2CH_2OH)_3$)	NO2	G	500ml	1										
10	Sodium azide (NaN_3)	SO2	G	100g	1	Aug. 6, 2006									
12	Hydroclolic acid (HCL)	SO2	G	2.5 L	1										
13	Formaldehyde	SO2	G	2.5 L	1										
14	Sodium hydrogen sulfite 40% Solution (NaHSO3)	SO2	G	1.0L	1										
15	Iodine (0.1 N)	SO2,Ox	—	500ml	1										
16	Sodium sulfate (Na_2SO_4)	SO2	G	500g	1										
17	Mercury (II) chloride ($HgCL_2$)	SO2	G	500g	1										
18	Sodium chloride (NaCL)	SO2	G	1 kg	1										
19	Glycerin ($HOCH_2CHOHCH_2OH$)	SO2	G	1 L	2										
20	Starch, soluble ($((C_6H_{10}O_5)n)$)	SO2,Ox	1	1 kg	1										
21	Mercury (II) iodide, red (HgI_2)	SO2	G	100g	1										
22	Sodium thiosulfate pentahydrate ($Na_2S_2O_3・5H_2O$)	SO2,Ox	Semi-G	1 kg	1										
23	Potassium iodate (KIO_3)	SO2	G	100g	1	July 2006									
24	Potassium iodide (KI)	SO2	G	1 kg	1										
25	Hydrochloric acid (1 N) (1N-HCL)	SO2	G	1 L	1	Aug. 6, 2006									
26	Sodium fluorid (NaF)	F	G	500g	1										
27	Lanthanum nitrate hexahydrate (La(NO3)3・6H2O)	F	Semi-G	25g	1										
28	Alizarin complexone dihidrate, indicator grade (C19H15 NO8・2H2O)	F	—	1g	1	Aug. 23, 2006									
29	Silicon dioxide (SiO2)	F	G	500g	1	Aug. 6, 2006									
30	Fhosphoric acid (H3PO4)	F	G	2.5L	1										
31	Phenolphthalein (C20H14O4)	F	G	100g	1										
32	Perchloric acid (HCLO4)	F	G	1 L	1	July 2006									
33	Sodium hydroxide, pellets (NaOH)	F	G	1 kg	1										
Check person															

Record of usage condition for reagent (2)

Check the residue quantity of the reagent four times a year.
The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	Name	Specifications			Q'ty	Date of	Expiration	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total	Delivery	date for use	/	/	/	/	/	/	/	/
34	Ammonia solution, 25% (NH4OH)	F	G	2.5 L	1	Aug. 6, 2006									
35	Ammonium acetate, >98% (CH3COONH4)	F	Semi-G	500g	1										
36	Sodium acetate, trihydrate	F	G	500g	1										
37	Acetone	F	G	2.5 L	2										
38	Potassium dihydrogenephosphat (KH2PO4)	Ox	—	500g	1										
39	Disodium hydrogen phosphate-12water (Na2HPO4・12H2O)	Ox	G	1 kg	1										
40	Potassium iodide (KI)	Ox	G	1 kg	1	July 2006									
41	Iodine (I)	Ox, SO2	G	500g	1	Aug. 6, 2006									
42	Nessler's reagent	NH3	-	500ml	1										
43	Methylene blue	H2S	G	100g	1										
44	Phosphoric Acid (H3PO4)	NO2	G	2.5 L	1										
45	Sulfanilamide	NO2	G	500g	1										
Check person															

Record of usage condition for reagent (3)

Check the residue quantity of the reagent four times a year.
The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	**Name**	**Specifications**			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
Check person															

Maintenance record table of glasswares (1)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Whole Pipettes	Glass, 1 ml	3	Aug. 13, 2006								
		Glass, 2 ml	3									
		Glass, 5 ml	5									
		Glass, 10 ml	5									
		Glass, 20 ml	3									
		Glass, 50 ml	2									
	Graduated pipettes	Glass, 1 ml	2									
		Glass, 5 ml	3									
		Glass, 10 ml	4									
	Pipette Fillers	Applicable pipette's capacity: not more than 2mL	1	Aug. 13, 2006								
	(Rubber Pippeter)	Capacity: 25mL	2									
	Ceramic mortar	Size: 110-130mm	1									
	Beakers	50 ml, Glass, Color: clear	2									
		100 ml, Glass, Color: clear	10									
		250 ml, Glass, Color: clear	10									
		400 ml, Glass, Color: clear	2									
		600 ml, Glass, Color: clear	5									
		1000 ml, Glass, Color: clear	2									
		2000 ml, Glass, Color: clear	1									
	Volumetric Flasks	25 ml, Color: clear, joint and poly stopper	2									
		50 ml , Color: clear, joint and poly stopper	4									
		100 ml ,Color: clear, joint and poly stopper	10									
		200 ml Color: clear, joint and poly stopper	2									
		500 ml , Color: clear, joint and poly stopper	2									
		1000 ml , Color: clear, joint and poly stopper	1									
	Erlenmeyer Flasks	100 ml, Borosilicate glass, color: clear	5									
		250 ml, Borosilicate glass, color: clear	5									
		300 ml, Borosilicate glass, color: clear	5									
		500 ml, Borosilicate glass, color: clear	2									
		1000 ml, Borosilicate glass, color: clear	1									
	Erlenmeyer Flasks with Ground Joints	100 ml, Borosilicate glass, color: clear	5									
		250 ml, Borosilicate glass, color: clear	5									
		300 ml, Borosilicate glass, color: clear	5									
		500 ml, Borosilicate glass, color: clear	2									
Check person												

Maintenance record table of glasswares (2)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Graduated Cylinders	50 ml, Borosilicate glass, A B class, Color: clear	2									
		100 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		250 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		500 ml, Borosilicate glass, ~~A~~ B class, Color: clear	2									
		1000 ml, Borosilicate glass, ~~A~~ B class, Color: clear	1									
	Watch Dish	φ65-75mm	2	Aug. 13, 2006								
		φ90-100mm	2									
		φ125mm	2									
		φ150mm	2									
		φ180-200mm	2									
	Wash Bottles	Capacity: 500 ml, Polypropylene	3									
		Capacity: 1000 ml, Polypropylene	3									
	Beaker with handle	Capacity: 1000 ml, Polypropylene	1									
	Test Tube with stopper	Test tube, 18(dia.) x 180 (L) mm $16, 100 pcs/case	1	Aug. 13, 2006								
	Stainless Spoon	Stainless Spoon (middle size: 180 mm)5pc/box	1									
	Funnels	Soda-lime glass, Angle: 60°, with short stem, φ70 mm	5									
		Soda-lime glass, Angle: 60°, with short stem, φ100 mm	5									
	Glass rods	Glass rods, 750 (L) x 5(dia.)mm	2									
		Glass rods, 750 (L) x 8(dia.)mm	2									
	Glass tube	Glass tube, 750 (L) x φ6×φ8mm	2									
	Stoppcock	Stoppcok, φ6×φ8mm, Fluoroplastic (PTFE) or equivalent, Temperature resistant	1	Aug. 13, 2006								
	Pinchcok	Pinchcok (Size M), Stainless steel	5									
	Screw Cock	Screw Cock (Size M), Stainless steel	5									
	Stopwatch	Manual rolling	1									
	Micro pipet	2～20 μl	1									
		10～100 μl	1	Aug. 13, 2006								
	Chip for micro pipet	0.5～10 μl, 1000 pcs/package	1									
		2～200 μl, 1000 pcs/package	1									
	Thermometer	Mercury type cylinder shape thermometer, -20～100℃	2									
	Beaker tongs	Tongs for flask	1									
	Cork borer	Cork borer sets saw-shaped edge (No. of borers, 12)	1	Aug. 13, 2006								
	Muff	Clamp Holders, Horizontal stick	10									
	Jumbo muff	Clamp Holders, Horizontal stick	5									
Check person												

Maintenance record table of glasswares (3)

Record the quantity when glasswares are bought or damaged.

Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Clamps	Open diameter: 5～50 mm	5									
		Open diameter: 5～80 mm	5									
	Tweezers	Odontology department tweezers	2	Aug. 13, 2006								
	Vacuum hose	Vacuum hose φ8×φ21mm (5 m/ Unit)	1									
	Rubber tube	Rubber tube φ6×φ9mm (10 m/ Unit)	1									
	Silicon rubber tube	Silicon rubber tube 'φ6×φ9mm, (10m/ Unit)	2									
	Silicon rubber tube	Silicon rubber tube 'φ8×φ10mm, (10m/ Unit)	1	Aug. 13, 2006								
	Tube joint	Straight, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
		T type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
		Y type, Glass, φ6 × φ8 mm, (10 pcs/ case)	1									
	Support for test tubes	for 18(dia.) x 180 (L) test tube, Number of partitions: 5×10	1									
	Weighing Paper	Weighing Paper 500pcs/box, Large (Size: approx. 120 x 120 mm)	1									
		Weighing Paper 500pcs/box, Small (Size: approx. 90 x 90 mm)	1									
	Vacuum Pump	Capacity: 1.08-1.3 liter/min, Ultimate vacuum: 440mmHg	1	Aug. 13, 2006								
	Glass fiber filter paper*1	φ50 mm, 100 pcs (Low gas absorption type) for Air Sampling	2									
	Quartz fiber filter paper*1	8'×10', 25 pcs	1									
	Glass fiber filter paper*1	8'×10', 100 pcs	2									
	Membrane filter	0.45μm, φ47 mm, 100 pcs cellulose	2	Aug. 13, 2006								
	pH Paper	pH paper: Roll type, 4 pcs/case	2									
	Pipet container	Applox. 450 (W) × 300 (D)) × 70 (H) mm	1									
	Pipet support	Plastic or more fine quality, Size: Approx. 200×170×250 (H) mm, H tipe	1	Aug. 13, 2006								
	Stand for micro pipet	Number of sets of syringes : 5-6 psc	1									
	Waste water container	Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 20 L, Color: White, Stopper: Two	8									
		Type: Bottle with grip (shape: Rectangle), Material: Polyethylene, Capacity: 5 L, Color: White, Stopper: One	8									
	Flask filtering	1000 ml, Borosilicate glass	1									
	Seal tape	Made of teflon, Applox. 10mm× 15 m	2	Aug. 13, 2006								
	Paraffin film	4" × 125 feet	2									
	Pipet cleaner	Inside size of basket: Approx. 500×φ136 mm	1									
Check person												

Maintenance record table of glasswares (4)

Record the quantity when glasswares are bought or damaged.
Moreover, confirm the possession quantity of glasswares once a year.

Management No.	Name	Specifications	Q'ty	Checked Day and Increase and Decrease Quantity								
				Delivery	/	/	/	/	/	/	/	/
	Brush	For bottle washing (small: No2)	2									
		For bottle washing (middle: No5)	2									
		For bottle washing (large: No10)	2									
		For Pipettes	2									
	Color comparition tubes	50 ml, with white graduated, With stopping	10									
	Color comparition tubes	100 ml, 2 ring marks, Cylinder. Tall form, Germany	4	Aug. 13, 2006								
	Tube support	For color comparition, For 100ml color comparition tube ×10 pcs	1									
	Pasteur Pipette	150 mm, 1000 pcs, Borosilicate	1									
		230 mm, 1000 pcs, Borosilicate	1									
	Dropping Bottle	50 ml	2									
		100 ml	1									
	Crucible	Crucible, porcelain, 38 ml	10									
		Crucible, porcelain, 50ml	10									
	Porcelain dish tongs	Porcelain dish tongs	1									
	Standard Sieve	Applox. Φ200 mm, mesh: 2mm	1									
	Weighning Bottle	Applox. φ50mm, H35mm	5									
	Desiccator	Desiccator, glass, 180mm (dia.)	1									
	Conical beaker	250 ml	10									
	Bottle for sample collection	1000 ml, Polypropylene, with screw closure, Wide-mouse bottle,	20	Aug. 13, 2006								
	Rubber Bulb for Small Pipette	Vinyl-methyl Silicon rubber for graduated pipettes (1ml)	2									
		Vinyl-methyl Silicon rubber for graduated pipettes (5ml)	2									
	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	Vinyl-methyl Silicon rubber for graduated pipettes (10ml)	2	Aug. 13, 2006								
	Cleaning Tissue	45 boxes of 200 tissues	1									
	Goggles	Plastic, with side guard	2									
	Cleaning Agent	For removing grease, oil, wax, dye residue, silicone, etc. Volume: 2 liters	1									
	Burret	Burret 25 ml , Color: clear	2									
		Burret 50 ml , Color: clear	2									
	Burret stand	Double holder	1									
Check person												

Record of usage condition for reagent (1)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

Management No.	Name	Specifications			Q'ty	Date of Delivery	Expiration date for use	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total			/	/	/	/	/	/	/	/
1	Acetic acid (CH_3COOH)	NO2	G	2.5 L	1	Aug. 6, 2006									
2	Sulfanilic acid ($H_2NC_5H_4SO_3H$)	NO2	G	100g	1										
3	*N*-(1-Naphthyl) ethylenediamine dihydrochloride For NOx analysis ($C10H7NHCH2CH2NH2 \cdot 2H2O$)	NO2	—	25g	1	Aug. 23, 2006									
4	Potassium permanganate For NOx analysis ($KMnO_4$)	NO2	—	1 kg	1	Aug. 6, 2006									
5	Sulfuric acid (H_2SO_4)	NO2, F	G	2.5 L	1	July 2006									
6	Sodium nitrite ($NaNO_2$)	NO2	G	500g	1	Aug. 6, 2006									
7	Chloroform, certified ($CHCl_3$)	NO2	UGR	2.5 L	1										
8	Barium hydroxide octahydrat ($Ba(OH)_2 \cdot 8H_2O$)	NO2	G	500g	1										
9	Triethanol amine ($N(CH_2CH_2OH)_3$)	NO2	G	500ml	1										
10	Sodium azide (NaN_3)	SO2	G	100g	1	Aug. 6, 2006									
12	Hydroclolic acid (HCL)	SO2	G	2.5 L	1										
13	Formaldehyde	SO2	G	2.5 L	1										
14	Sodium hydrogen sulfite 40% Solution (NaHSO3)	SO2	G	1.0L	1										
15	Iodine (0.1 N)	SO2,Ox	—	500ml	1										
16	Sodium sulfate (Na_2SO_4)	SO2	G	500g	1										
17	Mercury (II) chloride ($HgCL_2$)	SO2	G	500g	1										
18	Sodium chloride (NaCL)	SO2	G	1 kg	1										
19	Glycerin ($HOCH_2CHOHCH_2OH$)	SO2	G	1 L	2										
20	Starch, soluble ($(C_6H_{10}O_5)n$)	SO2,Ox	1	1 kg	1										
21	Mercury (II) iodide, red (HgI_2)	SO2	G	100g	1										
22	Sodium thiosulfate pentahydrate ($Na_2S_2O_3 \cdot 5H_2O$)	SO2,Ox	Semi-G	1 kg	1										
23	Potassium iodate (KIO_3)	SO2	G	100g	1	July 2006									
24	Potassium iodide (KI)	SO2	G	1 kg	1										
25	Nessler's reagent	NH3	-	500ml	1										
26	Methylene blue	H2S	G	100g	1										
27	Phosphoric Acid (H3PO4)	NO2	G	2.5 L	1										
28	Sulfanilamide	NO2	G	500g	1										
Check person															

Record of usage condition for reagent (2)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	Name	Specifications			Q'ty	Date of	Expiration	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total	Delivery	date for use	/	/	/	/	/	/	/	/
Check person															

Record of usage condition for reagent (3)

Check the residue quantity of the reagent four times a year.

The user must report to the management representative promptly when the residue quantity decreases. [Person in charge:]

NO	Name	Specifications			Q'ty	Date of	Expiration	Confirmed day and usage condition of reagent							
		Usage	Grade	Amount	Total	Delivery	date for use	/	/	/	/	/	/	/	/
Check person															

Annex 2-2:
Recording Documents

2.2.1 Basic Water Quality

2005-06-10

Field Measurement and Observation Record

سجل القياسات والملاحظات الميدانية

Date: التاريخ _____ Time: الوقت _____ Type of waterbody: نوع جسم الماء _____

Name of sampling station: اسم محطة الاعتيان _____ Sampling station code: رمز محطة الاعتيان _____

Longitude: خط الطول _____ Latitude: خط العرض _____

Weather now: الطقس الآن — Clear/sunny صحو/مشمس ☐ Overcast غائم ☐ Rain (steady) ماطر باعتدال ☐ Rain (heavy) ماطر بغزارة ☐

Past 24 hours: الـ 24 ساعة الماضية — Clear/sunny صحو/مشمس ☐ Overcast غائم ☐ Rain (steady) ماطر باعتدال ☐ Rain (heavy) ماطر بغزارة ☐

Width (m): العرض — <1 ☐ 1-2 ☐ 3-5 ☐ 6-10 ☐ 11-20 ☐ >20 ☐ ( )

Depth (m): العمق — <0.1 ☐ 0.1-0.3 ☐ 0.4-0.6 ☐ 0.7-1.0 ☐ 2-5 ☐ >5 ☐ ( )

Estimated velocity (m/s): السرعة المقدرة: — <0.2 ☐ 0.2-0.4 ☐ 0.5-0.7 ☐ 0.7-1 ☐ >1 ☐ ( )

Rubbish: نفايات — None لا يوجد ☐ Little قليل ☐ Moderate معتدل ☐ Many كثير ☐

Odor: الرائحة — Absent غائبة ☐ Little قليلة ☐ Moderate معتدلة ☐ Strong قوية ☐

Oil slick: الانزلاق بالزيوت — None لا يوجد ☐ Little قليل ☐ Moderate معتدل ☐ Many كثير ☐

Brief description of site: وصف مختصر للموقع _____

Comments: ملاحظات _____

Parameter المعيار	Color	SS	COD	BOD	NO_3	PO_4	Cl^-	NH_3	Turbidity
Sample Volume (L) حجم العينة	2 L								

Observer: المراقب — Name: اسم _____ Signature: التوقيع _____

Sample received by: تم استلام العينة من قبل — Name: الاسم _____ Signature: التوقيع _____

Water Quality Results نتائج نوعية المياه

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Replicate Sample (No.3) Result نتيجة العينة المكررة رقم 3	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم المحلل	Remarks
Field Measurement					**القياسات الميدانية**		
pH	pH units وحدات						
Air temp. حرارة الهواء	^{0}C						
Water temp. حرارة الماء	^{0}C						
EC	µS/cm						
TDS	mg/l						
DO	mg/l						
Laboratory Analysis					**التحليل المخبري**		
Color	Unit						
SS	mg/l						
COD_{Cr}	mg/l						
BOD_5	mg/l						
NO_3^--N	mg/l						
PO_4^{3-}	mg/l						
Cl^-	mg/l						
NH_3-N	mg/l						
Turbidity العكارة	NTU						

Name of Sampling station اسم محطة الاعتيان: _____ Type of Waterbody: نوع جسم الماء _____ Date of Analysis: تاريخ التحليل _____

Signature of Laboratory Chief: توقيع رئيس المخبر _____ Signature of Director: توقيع المدير _____

Table 1 Operation and Maintenance (O/M) Record of Equipment in_____DFEA

الجدول -1- سجل تشغيل و صيانة التجهيزات لمديرية

2006/1/13

Name of Equipment		Usage	Number	Maker	Supplier	Purchased Date	Trouble Contents and Date	Repair Record (constants and date)	Remarks (recorder's name etc.)
اسم الجهاز :		استخدامه :	العدد	المصنع	المورّد	تاريخ الشراء	نوع المشكلة و تاريخها	سجل التصليح (التفاصيل و التاريخ)	ملاحظات (اسم المسجّل ..الخ)
1	Portable Colorimeter Kit (CEL/890)	SS, Color, NO_3^--N, PO_4^{3-}, NH_3-N,	1	HACH	MIMOSA	2005 Jun.	1)	1)	
2	Portable pH and Temp. Meter (sensION 1)	pH, Temp.	1	HACH	MIMOSA	2005 Jun.	1)	1)	
3	Portable EC and TDS Meter (sensION 5)	EC, TDS	1	HACH	MIMOSA	2005 Jun.	1)	1)	
4	Portable DO Meter (sensION 6)	DO	1	HACH	MIMOSA	2005 Jun.	1)	1)	
5	Portable Turbidity Meter (2100P)	Turbidity	1	HACH	MIMOSA	2005 Jun.	1)	1)	
6	COD Reactor (DRB 200-1)	COD_{Cr}	1	HACH	MIMOSA	2005 Jun.	1) Temperature can not reach 150^{0}C. (10th Dec. 2005) 2)	1) The reactor was sent to MIMOSA on 28th Dec. 2005., and heating system was changed. On 24 th Jan. 2006, DFEA receives the reparired reactor. 2)	Mr. …….
7	Digital Titrator (16900)	Cl^-	1	HACH	MIMOSA	2005 Jun.	1)	1)	
8	Stirring platform for BOD Analysis (OxiTop IS12)	BOD	2	WTW	MIMOSA	2005 Jun.	1)	1)	
9	BOD bottle with OxiTop measuring head	BOD	24	WTW	MIMOSA	2005 Jun.	1)	1)	
10	Incubator (TS 606/2i)	BOD	1	WTW	MIMOSA	2005 Jun.	1)	1)	
11	Analytical Balance (CP324S)	Reagents preparation	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
12	Table for Balance (YWT03)	For balance	1	Sartorius	MIMOSA	2005 Jun.	1)	1)	
13	Pure Water Unit (2001/4)	All of Parameters	1	GFL	MIMOSA	2005 Jun.	1)	1)	
14	Desktop Computer (for 14 DFEAs)	Data Analysis and Reporting etc.	1	Mall Tech	CMAX	2005 Jun.	1)	1)	
15	Printer	Reporting etc.	1	Hewlett-Packard	CMAX	2005 Jun.	1)	1)	
16	Digital Camera	Sampling Record and Reporting	1	Kodak CX7330	CMAX	2005 Jun.	1)	1)	

Operation and Maintenance (O/M) Record of Reagents in _____DFEA (Maker of reagents: HACH; Supplier: MIMOSA)

الجدول -2- سجل استخدام وحفظ الكواشف في مديرية

2006/6/17

	Name of Reagent اسم الكاشف	Usage استخدامه	Unit الوحدة	Number العدد	Purchased Date تاريخ الشراء	Expiration date تاريخ انتهاء الصلاحية	Existence of Toxicity وجود مواد سامة	Order No.	Stored no. in the end of Mar. لكمية المتبقية حتى نهاية شهر آذار	Stored no. in the end of Jun. الكمية المتبقية حتى نهاية شهر حزيران	Stored no. in the end of Sep. لكمية المتبقية حتى نهاية شهر أيلول	Stored no. in the end of Dec. الكمية المتبقية حتى نهاية شهر كانون الأول	Remarks (recorder's name) ملاحظات (اسم المسجّل ... الخ)
1	pH standards, pH 4.01	pH calibration	500 ml	2	2005 Jun.		NO	HACH 22834-49					
	pH standards, pH 7.00		500 ml	2				HACH 22835-49					
	pH standards, pH 10.00		500 ml	2				HACH 22836-49					
2	Conductivity standards, 180 µs/cm	EC&TDS calibration	100ml	1	2005 Jun.		NO	HACH 23075-42					
	Conductivity standards, 1,000 µs/cm		100ml	1				HACH 14400-42					
	Conductivity standards, 18,000 µs/cm		100ml	1				HACH 23074-42					
3	Turbidity Standards Kit for 2100 P Turbidity Meter (0.1, 20, 100, 800 NTU)	Turbidity calibration	500 ml for each	1	2005 Jun.		NO	HACH 26594-00					
4	Reagents (High range 0-1,500 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK	31	2005 Jun.		Yes (Hg, Ag, Cr)	HACH 21259-25					
5	Reagents for NO_3^--N (High range, 0-30.0 mg/l)	NO_3^--N	100 tests/PK	8	2005 Jun.		Yes (Cd)	HACH 21061-69					
6	Reagents for PO_4^{3-}(High range, 0-30.00 mg/l)	PO_4^{3-}	100 tests/PK	8	2005 Jun.		NO	HACH 2236-32, 1934-32					
7	Reagents for Cl^- (0-10,000 mg/l)	Cl^-	100 tests/set	8	2005 Jun.		Yes (Ag)	HACH 14397-01					
8	Reagents for NH_3-N (High range, 0-50 mg/l)	NH_3-N	50 tests/PK	15	2005 Jun.		Yes (CN^-)	HACH 26069-45					
9	Nitrification Inhibitor	BOD	500g	1	2005 Jun.		NO	HACH 2533-34					
10	BOD Nutrient Buffer Pillows	BOD	50 pillows/PK	15	2005 Jun.		NO	HACH 14160-66					
11	BOD Seed Inoculum	BOD	50 capsules/bottle	7	2005 Jun.		NO	HACH 24712-00					
12	NaOH Pack	BOD	1000g/PK	1	2005 Jun.		NO	Bobel-Sweden					
13	Reagents (Low range 0-150 mg/l) for COD_{Cr}	COD_{Cr}	25 tests/PK	2	2006 Jun.		Yes (Hg, Ag, Cr)	HACH 21258-25					
14	Reagents for NO_3^--N (Mid range, 0-5.0 mg/l)	NO_3^--N	100 tests/PK	1	2006 Jun.		Yes (Cd)	HACH 21061-69					
15	Reagents for PO_4^{3-}(Low range, 0-2.50 mg/l)	PO_4^{3-}	100 tests/PK	1	2006 Jun.		NO	HACH 21060-69					
16	Reagents for NH_3-N (low range, 0-2.50 mg/l)	NH_3-N	50 tests/PK	1	2006 Jun.		Yes (CN^-)	HACH 26045-45					
17	COD standard, 300 mg/l	Check COD	200 ml	1	2006 Jun.		NO	HACH 12186-29					
18	COD standard, 1000 mg/l	Check COD	200 ml	1	2006 Jun.		NO	HACH 22539-29					
19	NO_3^--N standard, 1.0 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 2046-49					
20	NO_3^--N standard, 10.0 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 307-49					
21	NO_3^--N standard, 100 mg/l	Check NO_3-N	500 ml	1	2006 Jun.		NO	HACH 1947-49					
22	PO_4^{3-}standard, 50 mg/l	Check PO_4^{3-}	500 ml	1	2006 Jun.		NO	HACH 171-49					
23	NH_3-N standard, 10 mg/l	Check NH_3-N	500 ml	1	2006 Jun.		NO	HACH 153-49					
24	NH_3-N standard, 50 mg/l	Check NH_3-N	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14791-10					
25	BOD standard, 300 mg/l	Check BOD	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14865-10					
26	BOD standard, 3000 mg/l	Check BOD	10 ml/16 Voluette Amples	1	2006 Jun.		NO	HACH 14866-10					
27	Cl^- standard, 1000 mg/l	Check Cl^-	500 ml	1	2006 Jun.		NO	HACH 183-49					
28	Bromine Water 30g/L	NO_2 interfering (NO_3 testing)	29 mL	1	2006 Jun.		NO	HACH 2211-20					
29	Phenol Solution	NO_2 interfering (NO_3 testing)	29 mL	1	2006 Jun.		NO	HACH 2112-20					
30	Sulfamic acid	NO_2 interfering (PO_4 testing)	113 g	1	2006 Jun.		NO	HACH 2344-14					
31	Phosphate Pretreatment Powder Pillows	Turbidity and color interfering	100/pkg	1	2006 Jun.		NO	HACH 14501-99					
32	Hydrochloric Acid, ACS	pH adjusting (NH_3-N, PO_4 etc.)	500 mL	1	2006 Jun.		NO	HACH 134-49					
33	Sulfide Inhibitor Powder Pillows	S interfering (Cl^-, NH_3-N testing)	100/pkg	1	2006 Jun.		NO	HACH 2418-99					
34	Mercuric Sulfate	Cl^- interfering (COD testing)	28.3 g	1	2006 Jun.		Yes (Hg)	HACH 1915-20					
35	Hydrogen Peroxide, 30% ACS	Sulfite interfering (Cl- testing)	500 mL	1	2006 Jun.		NO	HACH 144-11					

DFEA

مديرية شؤون البيئة في محافظة

Sample Information

معلومات عن العينة

Governorate	Sample Code	Sampling Date	Sampling time	Sample Volume (L)	Transmission Date	Transmission Time	Signature of Laboratory Chief	Signature of Director
المحافظة	رمز العينة	تاريخ الاعتيان	وقت الاعتيان	حجم العينة (ليتر)	تاريخ الإرسال	وقت الإرسال	توقيع رئيس المخبر	توقيع المدير

Preservation Method		Brief Description of Sample	
طريقة الحفظ		وصف مختصر للعينة	

The Results for Basic Water Quality Analysis

نتائج التحاليل الأساسية لجودة المياه

Parameter	pH	Air temp.	Water temp.	EC	TDS	DO	Color	SS	COD_{Cr}	BOD_5	NO_3^--N	PO_4^{3-}	Cl^-	NH_3-N	Turbidity	Date of Analysis
المعيار		حرارة الهواء	حرارة الماء												العكارة	
Unit	pH units	ºC	ºC	µS/cm	mg/l	mg/l	Unit	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	تاريخ التحليل
الوحدة	وحدات															
Result																
النتيجة																

Required Chemical & Biological Parameters

البارمترات الكيميائية و البيولوجية المطلوبة

Parameter	Total suspended solids (SS)	COD	NO_3^--N	PO_4^{3-}	Cl^-	NH_3-N	Oil & Grease	Settleable solids	Fluorides	Sulfide-S	Surfactants	Total count of the colony group (Coliform)	Cyan (CN)
المعيار	العوالق						الزيت & الشحم	المعلقات المستقرة	الفلوريد	الكبريتيد	خافض للتوتر السطحي	العدد الكلي لمجموعة المستعمرات	السيانيد
Required-مطلوب													

DAMASCUS DFEA

مديرية شؤون البيئة في محافظة دمشق

The Results for Chemical & Biological Analysis at Damascus DFEA

نتائج التحاليل الكيميائية و البيولوجية في مديرية شؤون البيئة في محافظة دمشق

Receiving Date	Receiving Time	Signature of the person who received the sample	Notes about Samples
تاريخ الاستلاتم	وقت الاستلام	توقيع المستلم	ملاحظات عن العينة

Parameter	Total suspended solids (SS)	COD	NO_3^--N	PO_4^{3-}	Cl^-	NH_3-N	Oil & Grease	Settleable solids	Fluorides	Sulfide-S	Surfactants	Total count of the colony group	Cyan (CN)
المعيار	العوالق						الزيت & الشحم	المعلقات المستقرة	الفلوريد	الكبريتيد	خافض للتوتر السطحي	العدد الكلي لمجموعة المستعمرات	السيانيد
Unit													
الوحدة													
Result													
النتيجة													

Date of Analysis	Signature of Laboratory Chief	Signature of Director
تاريخ التحليل	توقيع رئيس المخبر	توقيع المدير

Operation and Maintenance (O/M) Record for Sending Waste Liquid to DAM from_____DFEA (Basic Water Quality Alaysis)

جدول رقم 5 - سجل التشغيل و الصيانة
لإرسال المنصرفات السائلة إلى مديرية بيئة دمشق من مديرية بيئة ـــــــــــــ للتحاليل الأساسية لجودة المياه

No. of Containers عدد الحاويات _____

Volume of Each Container (L) حجم كل حاوية بالليتر _____

Total Quantity (L) الكمية الكلية بالليتر _____

Stored Period: فترة التخزين From من _____ Year سنة _____ Month شهر _____ Day يوم _____ To إلى _____ Year سنة _____ Month شهر _____ Day يوم _____

Waste for Analysis: منصرفات التحاليل

Waste Contents: محتويات الصرف

COD_{Cr} ☐	NO^{3-}-N ☐	Cl^- ☐	PO_4^{3-} ☐	NH_3-N ☐
$HgSO_4$, $AgSO_4$,(Catalyst) $Cr_2(SO_4)_3$ (Cr^{3+}high range), Cr_2O_7, (Cr^{6+}low range)	Cd^{2+}, Sulfanilic Acid	$AgNO_3$, K_2CrO_4 (indicator)	Molybdate, Ascorbic Acid (low range) Molybdate, Amino Acid (high range)	Chlorine, Salicylate, Cyanurate, Cyanide (CN^-) (pH>10)

Other Items:
عناصر أخرى _____

Is there a "Hazardous Chemical Waste from _____DFEA" label on the containers? ☐
هل تم وضع لوحة "منصرفات كيميائية خطرة من مديرية بيئة ـــــــــ" على الحاويات

Remarks (Additional Information etc.)
ملاحظات : معلومات إضافية _____

Transporting Date to Damascus DFEA: تاريخ النقل إلى مديرية بيئة دمشق Year سنة _____ Month شهر _____ Day يوم _____

Name: الاسم _____ **Signature:** التوقيع _____

Annex 2-2:
Recording Documents

2.2.2 Chemical and Biological Quality

Chemical & Biological Water Quality Results 2 (Damascus Countryside, Homs, Aleppo)

نتائج نوعية المياه الكيميائية والبيولوجية (ريف دمشق، حمص، حلب)

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Information of dillution[#1] (*2, *5, *10, *20, *50, *100)	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم وتوقيع المحلل	Pretreatment	Remarks ملاحظات
Field Measurement							**القياسات الميدانية**	
Air temp. حرارة الهواء	^{0}C							
Water temp. حرارة الماء	^{0}C							
Laboratory Analysis							**التحليل المخبري**	
NH^3-N	mg/l							
NO_2-N	mg/l							
NO_3^--N	mg/l							
PO_4^{3-}	mg/l							
Sulfide (S^{2-})	mg/l							
Oil & grease	mg/l							
Surfactants Anionic	mg/l							
Hardness, Mg （mg/l,$CaCO_3$）	mg/l							
Hardness, Ca （mg/l,$CaCO_3$）	mg/l							
Hardness, Total （mg/l,$CaCO_3$）	mg/l							
Chromiumu, Hexavalent Cr(VI)	mg/l							
Chromiumu, Total (T-Cr)	mg/l							

Name of Sampling station
اسم محطة الاعتيان: _____

Type of Waterbody:
نوع جسم الماء

Date of Analysis:
تاريخ التحليل _____
/ /

Signature of Laboratory Chief:
توقيع رئيس المخبر _____

Note) #1: Put a number of dillution ratio أذكر عدد مرات التمديد

Chemical & Biological Water Quality Results 1(Damascus) نتائج نوعية المياه الكيميائية والبيولوجية (دمشق)

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Information of dillution#1 (*2, *5, *10, *20, *50, *100)	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم وتوقيع المحلل	Pretreatment	Note and Remarks ملاحظات
Field Measurement					**القياسات الميدانية**			
Air temp. حرارة الهواء	^0C							
Water temp. حرارة الماء	^0C							
Laboratory Analysis						**التحليل المخبري**		
pH	pH units وحدات							
COD_{Cr}	mg/l							
PO_4^{3-}	mg/l							
Cl^-	mg/l							
NH_3-N	mg/l							
NO_3^--N	mg/l							
Oil & grease	mg/l							
Total suspended solids (SS)	mg/l							
المعلقات المستقرة Settleable solids	mg/l							
Fluorides (F)	mg/l							
Sulfide (S^{2-})	mg/l							
خافض للتوتر السطحي Surfactants	mg/l							
العدد الكلي لمجموعة المستعمرات Total count of the colony group	MPN/100ml							
Chromiumu, Hexavalent Cr(VI)	mg/l							
Chromiumu, Total (T-Cr)	mg/l							
Cyan (CN^-)	mg/l							

Name of Sampling station اسم محطة الاعتيان: _____

Type of Waterbody: نوع جسم الماء

Date of Analysis: تاريخ التحليل _____ / /

Signature of Laboratory Chief: توقيع رئيس المخبر _____ _____

Note) #1: Put a number of dillution ratio أذكر عدد مرات التمديد

Annex 2-2:
Recording Documents

2.2.3 Heavy Metal

Ag Furnace HD-tube BGC-SR 15/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0006
2	0.0192
4	0.0428
6	0.0657
10	0.1072

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999505 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

2ppb - 001	0.0223
2ppb - 002	0.0235
2ppb - 003	0.0229
2ppb - 004	0.0205
2ppb - 005	0.0208
2ppb - 006	0.0211
2ppb - 007	0.0237

Standard Deviation

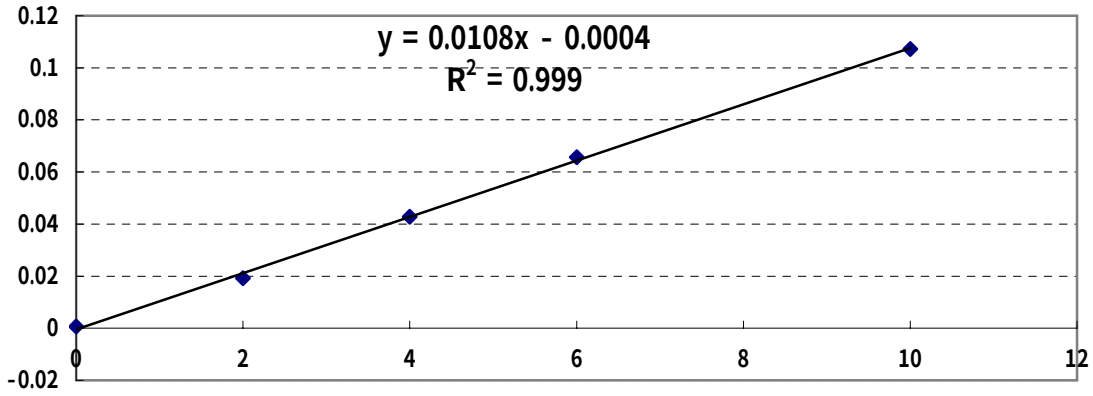
σ = 0.001308

Mean

avg = 0.022

Coefficient of Variation

CV(RSD) = 5.943953 =< 10



Ag (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Al Furnace Pyro-tube BGC-D2 16/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0158
5	0.0986
10	0.2116
20	0.4260
30	0.6510

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999283 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

5ppb - 001	0.1021
5ppb - 002	0.0946
5ppb - 003	0.1009
5ppb - 004	0.0988
5ppb - 005	0.0932
5ppb - 006	0.0998
5ppb - 007	0.0972

Standard Deviation

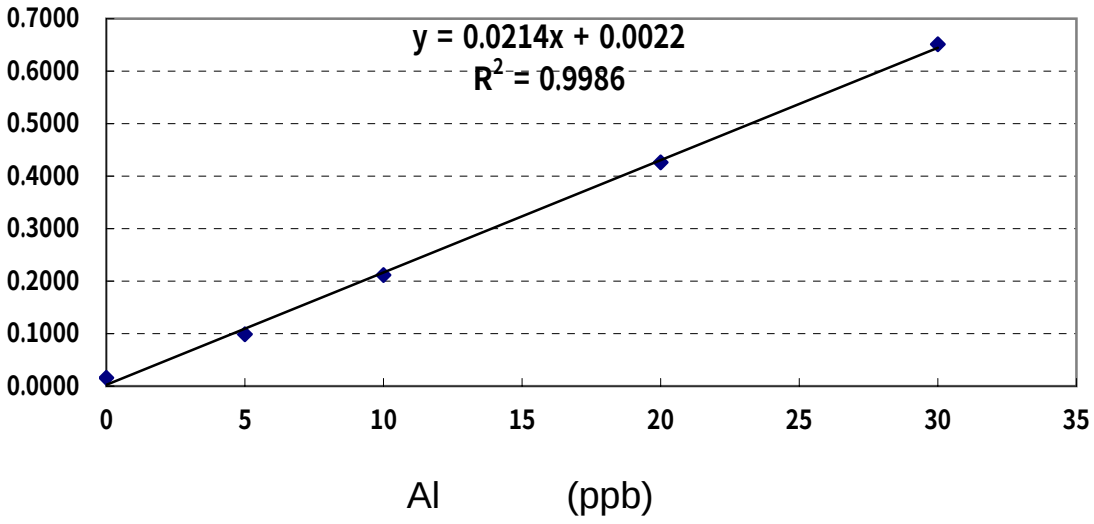
σ = 0.003887

Mean

avg = 0.09792

Coefficient of Variation

CV(RSD) = 3.969335 =< 10



Al (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Al Flame N2O-Ac BGC-D2 2007/12/2

Calibration Curve

conc. (ppm)	abs
0	-0.0005
1	0.0062
2.5	0.0137
5	0.0263
10	0.0509

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999407 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

1ppm-1	0.0077
1ppm-2	0.0074
1ppm-3	0.0078
1ppm-4	0.0075
1ppm-5	0.0079
1ppm-6	0.0073
1ppm-7	0.0071

Standard Deviation

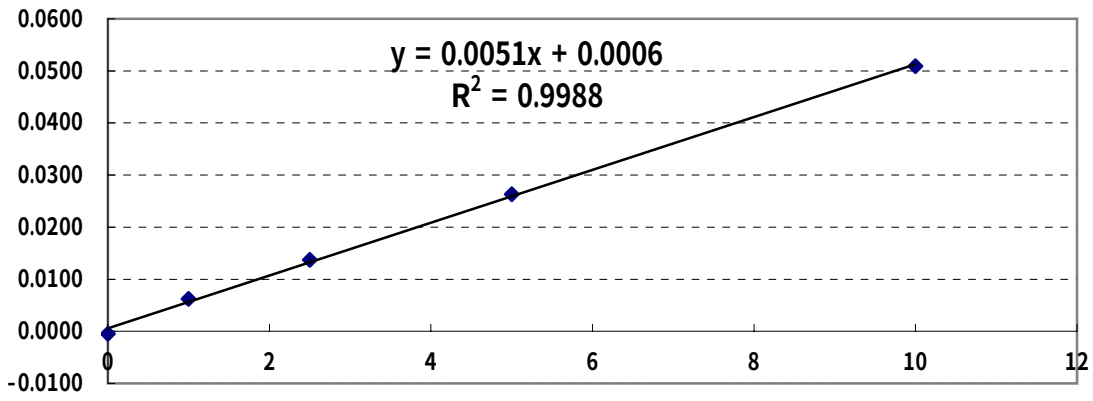
σ = 0.000207

Mean

avg = 0.00766

Coefficient of Variation

CV(RSD) = 2.707107 =< 10



Al (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

As Furnace Pyro-tube BGC-D2 18/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0294
10	0.2248
20	0.4789
30	0.6527
40	0.9429

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.997262 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

10ppb -001	0.2555
10ppb -002	0.2464
10ppb -003	0.2662
10ppb -004	0.2423
10ppb -005	0.2313
10ppb -006	0.288
10ppb -007	0.243

Standard Deviation

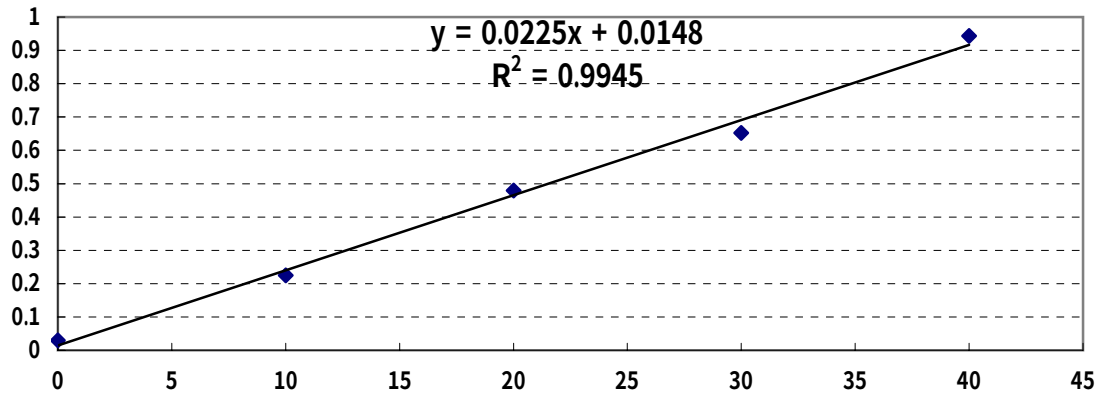
σ = 0.013237

Mean

avg = 0.24834

Coefficient of Variation

CV(RSD) = 5.330114 =< 10



As (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

As Hydride Vapor BGC-D2 2007/10/7

Calibration Curve

conc. (ppb)	abs
0	0.0044
5	0.0356
10	0.0839
20	0.1499
40	0.333
50	0.4242

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.998787 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

5ppb -001	0.035
5ppb -002	0.0361
5ppb -003	0.0408
5ppb -004	0.0392
5ppb -005	0.0361
5ppb -006	
5ppb -007	

Standard Deviation

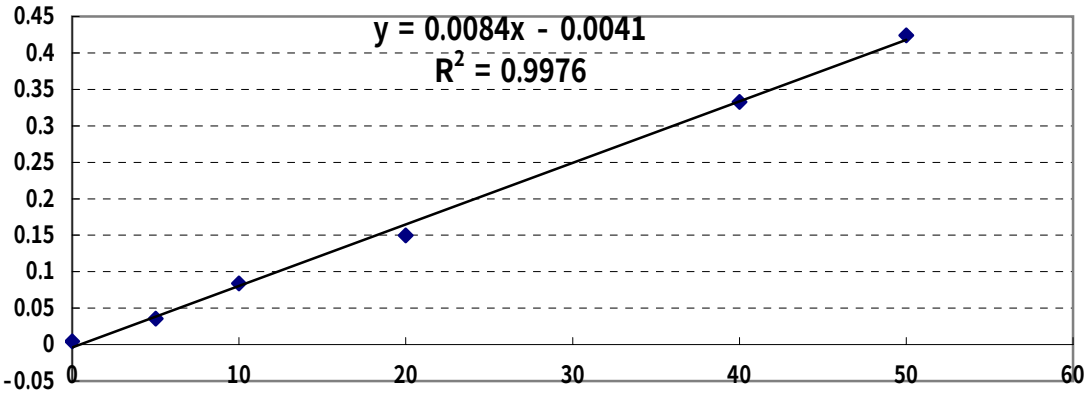
σ = 0.002446

Mean

avg = 0.03744

Coefficient of Variation

CV(RSD) = 6.533166 =< 10



As (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Ba Flame N2O-Ac NON-BGC 1/2/2007

Calibration Curve

conc. (ppm)	abs
0	0.0012
0.5	0.0046
1	0.0080
2	0.0160
5	0.0373

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999815 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppm-1	0.0043
0.5ppm-2	0.0044
0.5ppm-3	0.0049
0.5ppm-4	0.0042
0.5ppm-5	0.0039
0.5ppm-6	0.0038
0.5ppm-7	0.0037

Standard Deviation

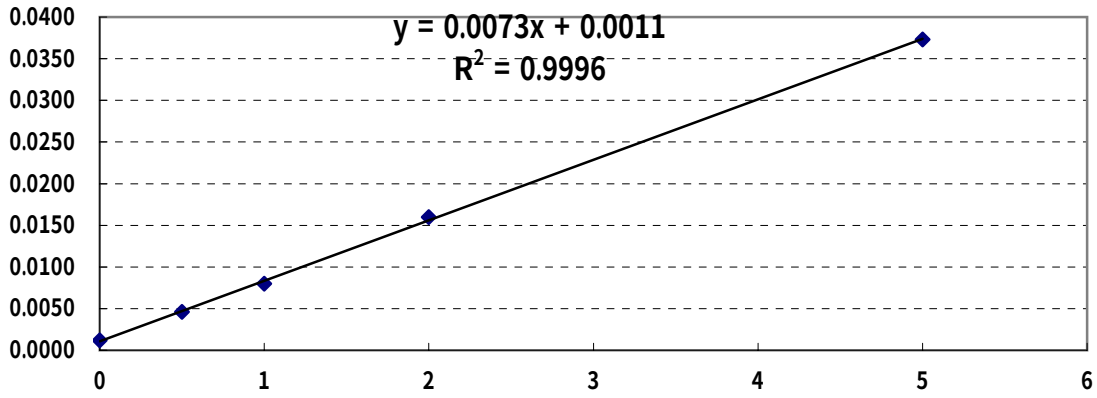
σ = 0.000365

Mean

avg = 0.00434

Coefficient of Variation

CV(RSD) = 8.403033 =< 10



Ba (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

Cd Furnace HD-tube BGC-SR 2007/12/11

Calibration Curve

conc. (ppb)	abs
0	-0.0043
0.2	0.0434
0.3	0.0743
0.4	0.0914
0.5	0.1182
0.6	0.1340
0.7	0.1496

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.995313 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.2ppb - 1	0.0567
0.2ppb - 2	0.0584
0.2ppb - 3	0.0587
0.2ppb - 4	0.0576
0.2ppb - 5	0.0606
0.2ppb - 6	0.0598
0.2ppb - 7	0.0576

Standard Deviation

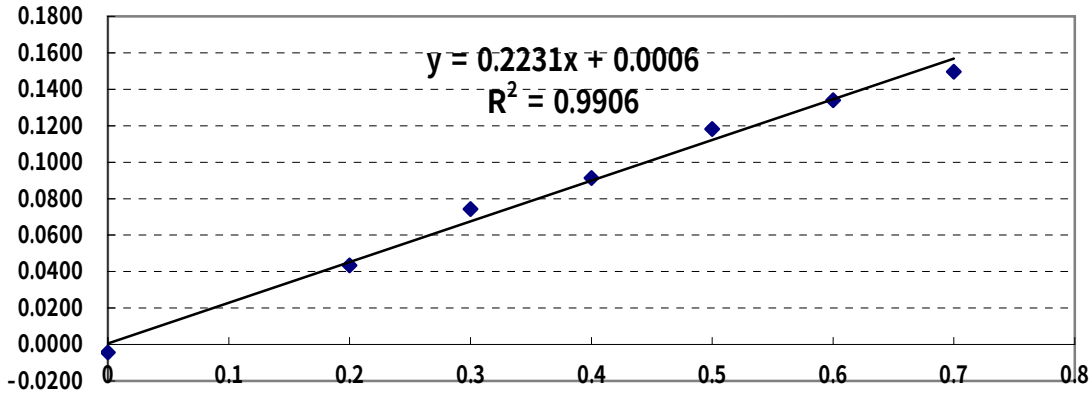
σ = 0.001454

Mean

avg = 0.0584

Coefficient of Variation

CV(RSD) = 2.490247 =< 10



Cd (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Cr Furnace Pyro-tube BGC-D2 16/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0048
1	0.1152
2	0.2202
4	0.4216
6	0.6210

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999838 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

1ppb - 001	0.1538
1ppb - 002	0.1364
1ppb - 003	0.1318
1ppb - 004	0.1315
1ppb - 005	0.1306
1ppb - 006	0.1231
1ppb - 007	0.1228

Standard Deviation

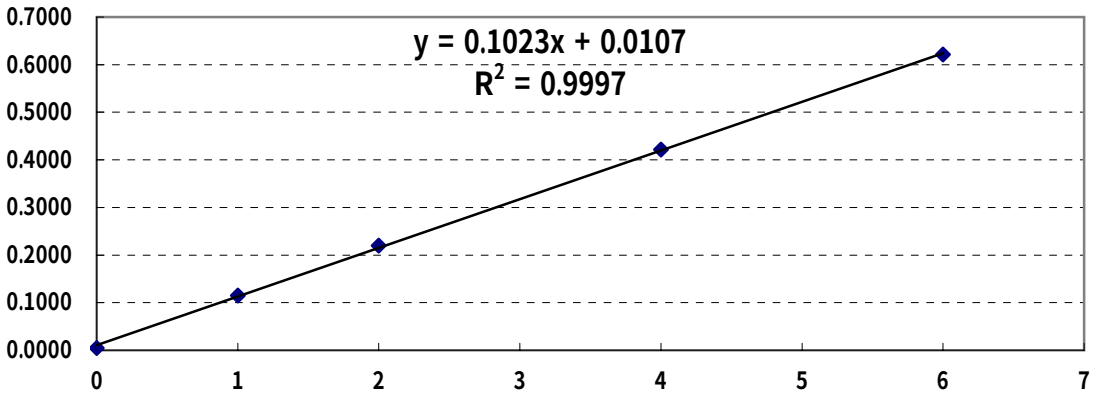
σ = 0.009756

Mean

avg = 0.13682

Coefficient of Variation

CV(RSD) = 7.130254 =< 10



Cr (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Cr flame Pyro-tube BGC-D2 22/11/2007

Calibration Curve

conc. (ppm)	abs
0	0.0006
0.5	0.0184
1	0.0374
2	0.0668
5	0.1641

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999691 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppm	0.4799
0.5ppm	0.4706
0.5ppm	0.4521
0.5ppm	0.4768
0.5ppm	0.446
0.5ppm	0.446
0.5ppm	0.4336

Standard Deviation

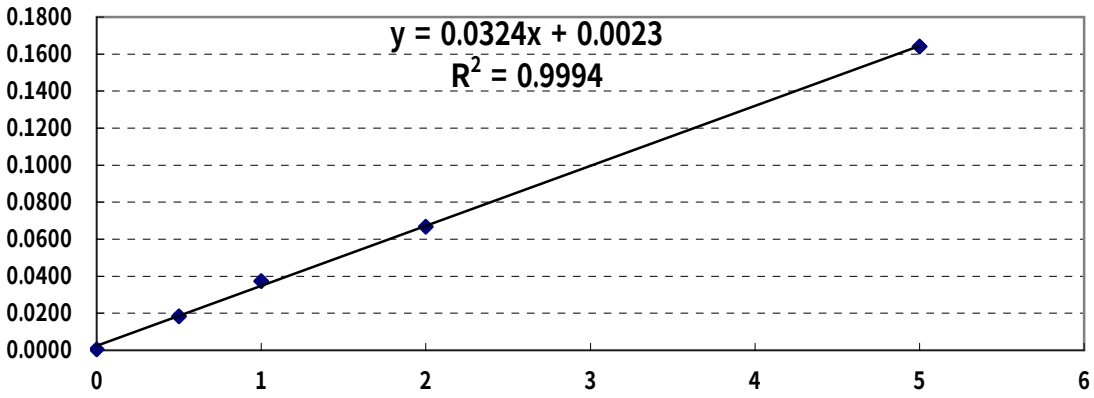
σ = 0.015166

Mean

avg = 0.46508

Coefficient of Variation

CV(RSD) = 3.26087 =< 10



Cr (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

Cu Flame Air-Ac BGC-D2 24/1/2007

Calibration Curve

conc. (ppm)	abs
0	-0.0012
0.5	0.0586
1	0.1191
2	0.2362
5	0.5516

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999503 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppm-1	0.0599
0.5ppm-2	0.0593
0.5ppm-3	0.0597
0.5ppm-4	0.0598
0.5ppm-5	0.0608
0.5ppm-6	0.0612
0.5ppm-7	0.0589

Standard Deviation

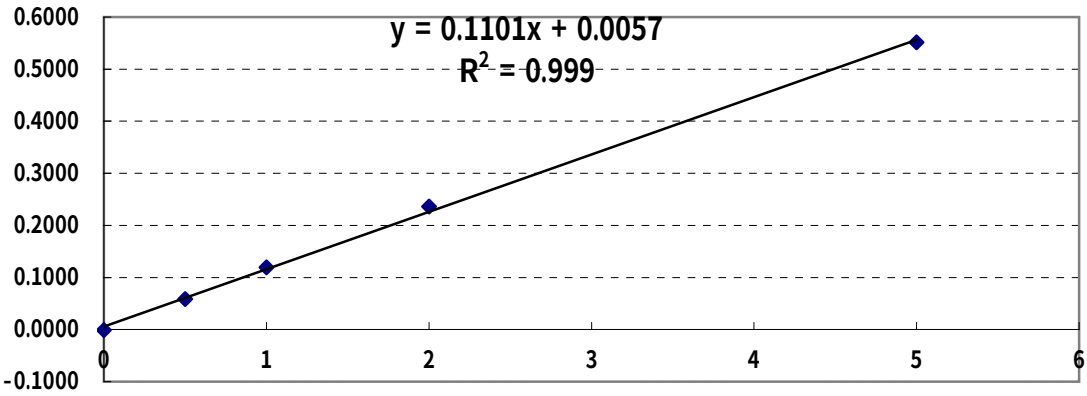
σ = 0.000552

Mean

avg = 0.0599

Coefficient of Variation

CV(RSD) = 0.921983 =< 10



Cu (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

Fe Flame Air-Ac BGC-D2 24/1/2007

Calibration Curve

conc. (ppm)	abs
0	-0.0004
0.25	0.0200
0.5	0.0400
1	0.0800
2	0.1550
5	0.3690

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999728 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.25ppm - 1	0.0203
0.25ppm - 2	0.0206
0.25ppm - 3	0.0207
0.25ppm - 4	0.0215
0.25ppm - 5	0.0209
0.25ppm - 6	0.02

Standard Deviation

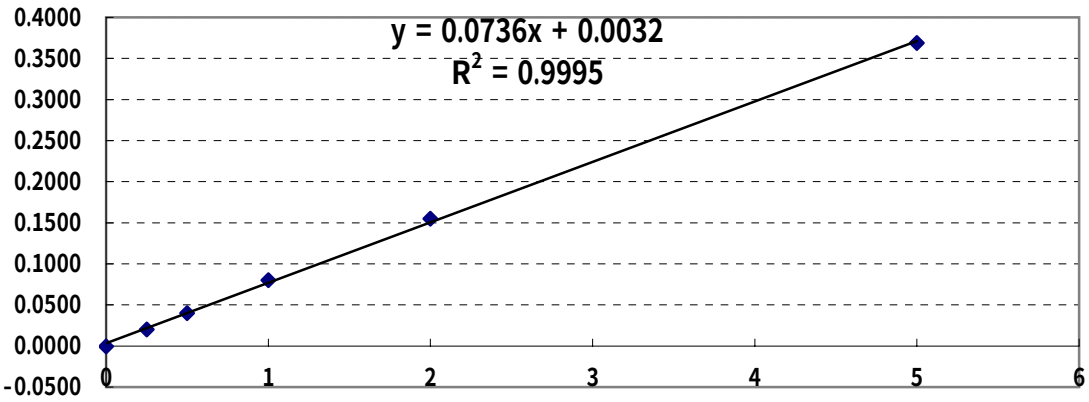
σ = 0.000447

Mean

avg = 0.0208

Coefficient of Variation

CV(RSD) = 2.150065 =< 10



Fe (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

Hg Cold Vapor BGC-D2 11/2/2007

Calibration Curve

conc. (ppb)	abs
0	-0.001
0.5	0.0062
1	0.0152
2	0.0335
5	0.0794

Correlation Coefficient

r = 0.999336 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppb - 001	0.0089
0.5ppb - 002	0.0086
0.5ppb - 003	0.0083
0.5ppb - 004	0.0078
0.5ppb - 005	0.0071
0.5ppb - 006	0.0067
0.5ppb - 007	0.0062

Standard Deviation

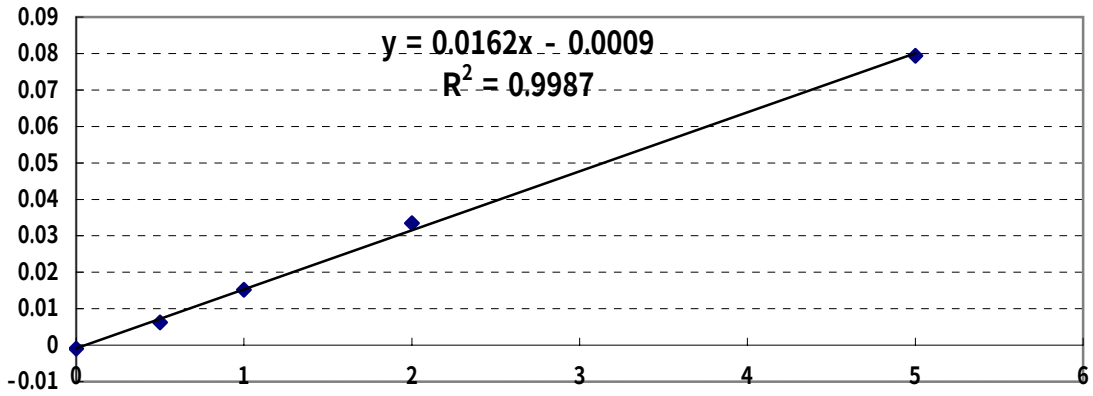
σ = 0.000709

Mean

avg = 0.00814

Coefficient of Variation

CV(RSD) = 8.712837 =< 10



Hg (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Mn Furnace Pyro-tube BGC-D2 16/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0072
0.5	0.1186
1	0.2196
2	0.4108
3	0.6122

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.99976 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppb - 001	0.1178
0.5ppb - 001	0.1192
0.5ppb - 002	0.116
0.5ppb - 002	0.1173
0.5ppb - 003	0.1156
0.5ppb - 003	0.1163
0.5ppb - 004	0.1152
0.5ppb - 004	0.1175

Standard Deviation

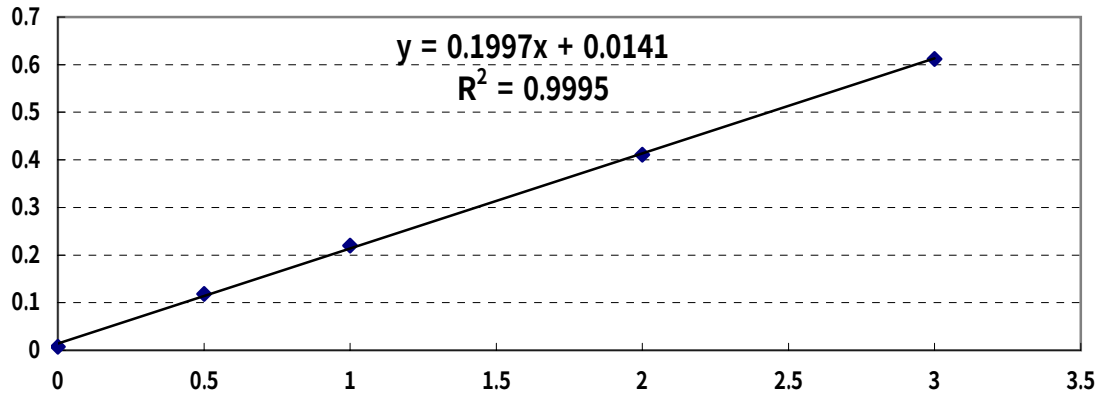
σ = 0.001446

Mean

avg = 0.11718

Coefficient of Variation

CV(RSD) = 1.234319 =< 10



Mn (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Mn Flame Air-c2h2 BGC-SR 2007/2/12

Calibration Curve

conc. (ppb)	abs
0	0.0002
0.5	0.0333
1	0.0652
2	0.1236
5	0.3146

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999909 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.5ppm - 001	0.0296
0.5ppm - 002	0.0305
0.5ppm - 003	0.0298
0.5ppm - 004	0.0292
0.5ppm - 005	0.03
0.5ppm - 006	0.0298
0.5ppm - 007	0.0304

Standard Deviation

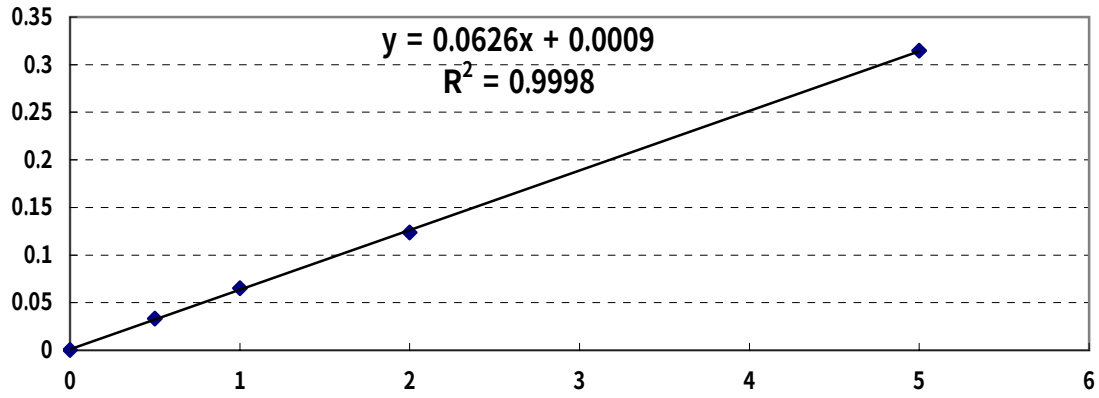
σ = 0.000482

Mean

avg = 0.02982

Coefficient of Variation

CV(RSD) = 1.615237 =< 10



Mn (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Ni Furnace HD-tube BGC-SR 4/2/2007

Calibration Curve

conc. (ppb)	abs
0	0.0129
2	0.0532
4	0.0984
6	0.1446
10	0.2141

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.998172 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

2ppb - 001	0.0457
2ppb - 002	0.0486
2ppb - 003	0.049
2ppb - 004	0.0512
2ppb - 005	0.0469
2ppb - 006	0.0497
2ppb - 007	0.0485

Standard Deviation

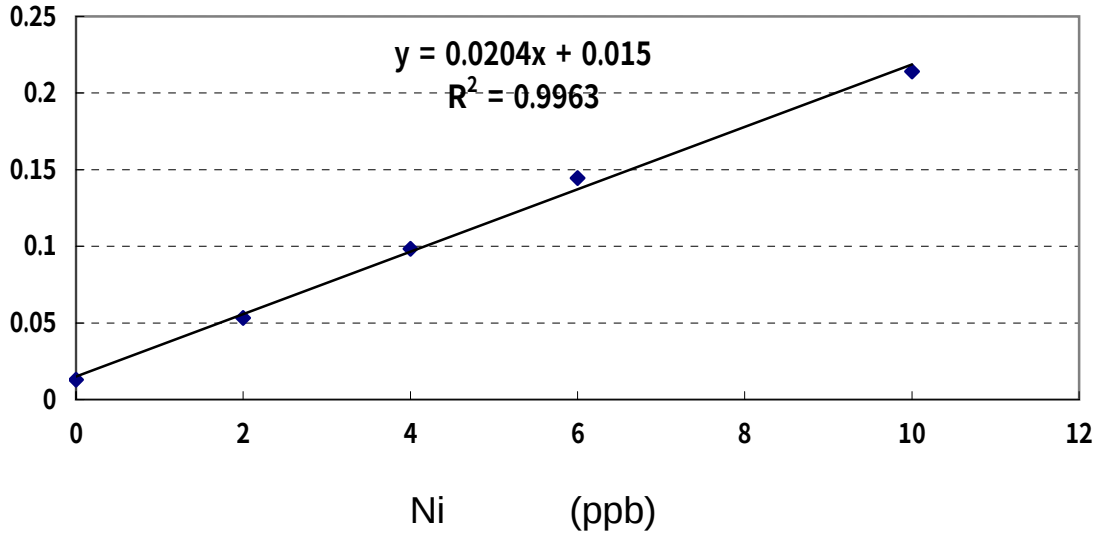
σ = 0.002104

Mean

avg = 0.04828

Coefficient of Variation

CV(RSD) = 4.358003 =< 10



Remark : (especially when the condition recommended by the cookbook had been changed)

Pb Furnace HD-tube BGC-SR 28/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0066
5	0.0877
10	0.1624
20	0.2862
30	0.4140

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.998666 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

5ppb - 001	0.0798
5ppb - 002	0.0809
5ppb - 003	0.0783
5ppb - 004	0.081
5ppb - 005	0.0783
5ppb - 006	0.0815
5ppb - 007	0.0794

Standard Deviation

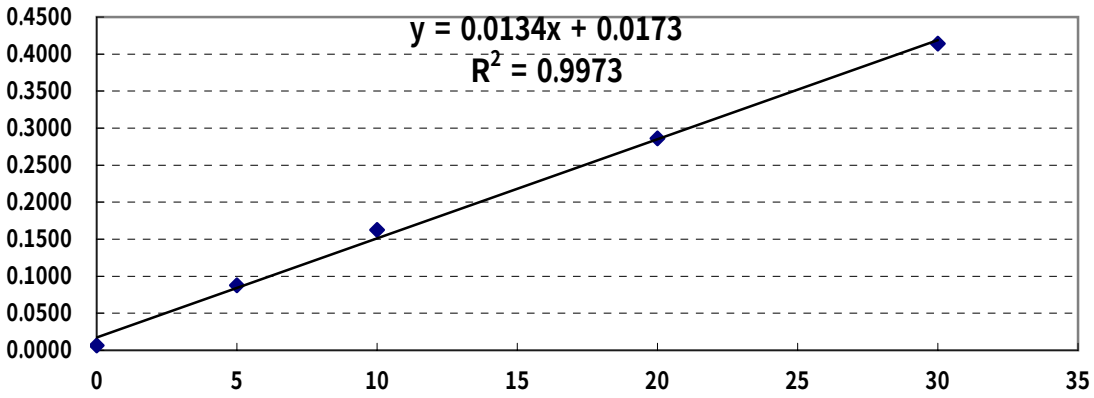
σ = 0.001328

Mean

avg = 0.07966

Coefficient of Variation

CV(RSD) = 1.666809 =< 10



Pb (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Pb Flame Air-Ac BGC-D2 (217.0 nm) 2007/8/2

Calibration Curve

conc. (ppm)	abs
0	-0.0012
0.2	0.0094
0.5	0.0210
1	0.0420
2	0.0835
5	0.1941

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.999424 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.2ppm - 1	0.0088
0.2ppm - 2	0.0094
0.2ppm - 3	0.0102
0.2ppm - 4	0.0094
0.2ppm - 5	0.0108
0.2ppm - 6	0.0109
0.2ppm - 7	0.0108

Standard Deviation

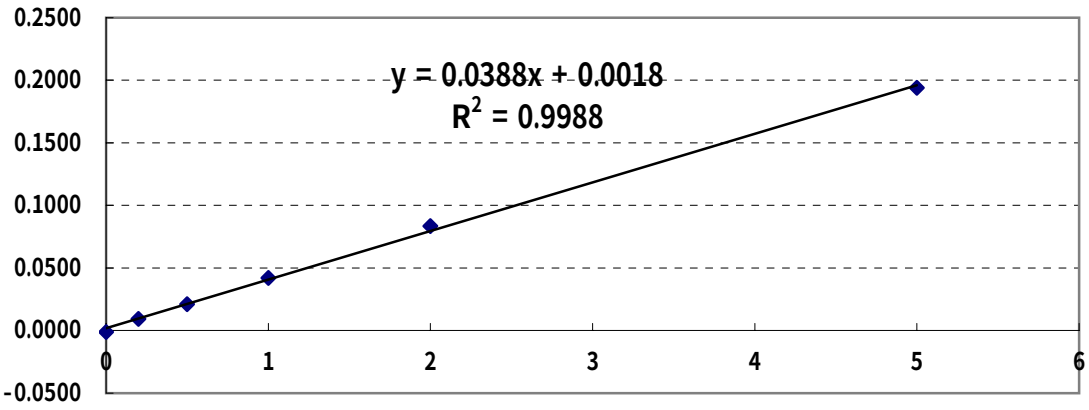
σ = 0.000782

Mean

avg = 0.00972

Coefficient of Variation

CV(RSD) = 8.048398 =< 10



Pb (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

217.0nm

Sb Furnace Pyro-tube BGC-D2 16/1/2007

Calibration Curve

conc. (ppb)	abs
0	0.0040
5	0.1073
10	0.2006
20	0.3522
30	0.4977

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.997517 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

5ppb - 001	0.1165
5ppb - 002	0.1109
5ppb - 003	0.1076
5ppb - 004	0.1035
5ppb - 005	0.1059
5ppb - 006	0.1117
5ppb - 007	0.1104

Standard Deviation

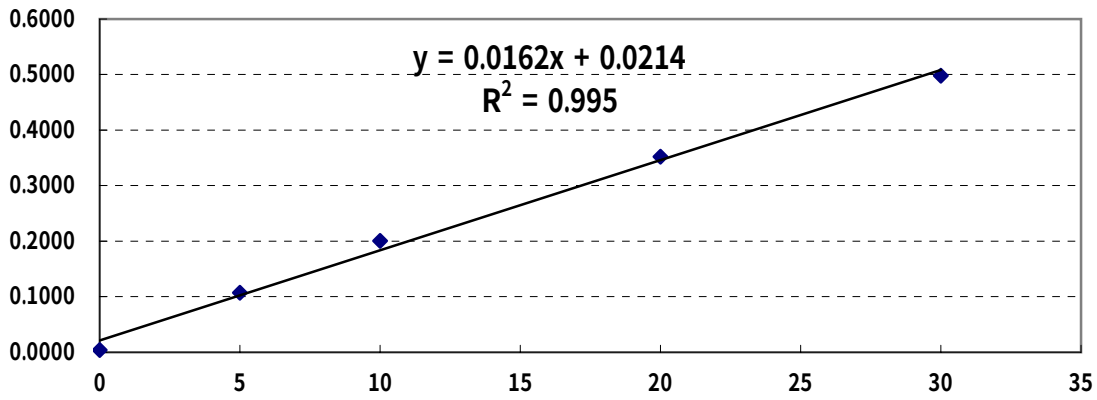
σ = 0.00504

Mean

avg = 0.10888

Coefficient of Variation

CV(RSD) = 4.628986 =< 10



Sb (ppb)

Remark : (especially when the condition recommended by the cookbook had been changed)

Zn Flame Air-Ac BGC-D2 21/1/2007

Calibration Curve

conc. (ppm)	abs
0	0.0068
0.1	0.0906
0.2	0.1377
0.5	0.3012
0.7	0.4067

* abs is an average of 2 measured values

Correlation Coefficient

r = 0.997904 >= 0.995

Quantitation Limit

* usually use first 5 values for caliculation

0.1ppm-001	0.0801
0.1ppm-002	0.0782
0.1ppm-003	0.0922
0.1ppm-004	0.0944
0.1ppm-005	0.0877
0.1ppm-006	0.0873

Standard Deviation

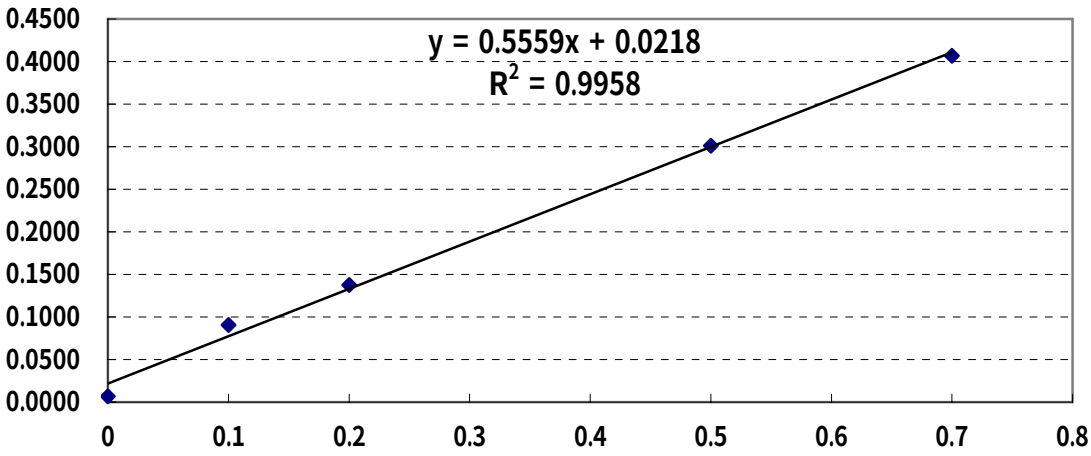
σ = 0.00718

Mean

avg = 0.08652

Coefficient of Variation

CV(RSD) = 8.298225 =< 10



Zn (ppm)

Remark : (especially when the condition recommended by the cookbook had been changed)

2007/12/4

Calibration Curves - List

Item		Method	Primary Target Quantitation Limits (TQL-1)	Essential Target Quantitation Limits (TQL-2)	Additonal Target Quantitation Limits (TQL-3)	10% absorption conc.	70% absorption conc.	std-1	std-2 (QL)	std-3	std-4	std-5	std -6	Necessary conc. of std
			ppm											
1	Ag	H D tube	0.05	0.05	0.005	0.0008	0.0056	0	0.002	0.004	0.006	0.01		10 ppb
2	Al	Pyro tube	1	0.2	0.02	0.005	0.035	0	0.005	0.010	0.020	0.030		50 ppb
	Al	N2O-C2H2				6.3	44.1	0	1.0	2.5	5.0	10.0		
3	As	Pyro tube	0.1	0.01	0.001	0.01	0.07	0	0.01	0.02	0.03	0.04		50 ppb
	As	Hydride				0.0006	0.0042	0	0.005	0.01	0.02	0.025	0.03	500ppb
4	Ba	N2O-C2H2	1	0.7	0.07	2.5	17.5	0	0.5	1	2	5		
5	Cd	H D tube	0.01	0.003	0.0015	0.00015	0.00105	0	0.0002	0.0004	0.0006	0.0007		1 ppb
6	Cr	Pyro tube	0.5	0.05	0.025	0.0017	0.0119	0	0.001	0.002	0.004	0.006		10 ppb
	Cr	Air-C2H2	0.5	0.05	0.025	0.8	5.6	0	0.5	1	2	5		
7	Cu	Air-C2H2	1	1	0.1	0.4	2.8	0	0.5	1	2	5		
8	Fe	Air-C2H2	1	0.3	0.03	0.8	5.6	0	0.25	0.50	1.00	2.00	5.00	
9	Hg	Cold Vapor	0.005	0.001	0.0005	0.0009	0.0063	0	0.0005	0.001	0.002	0.005		
10	Mn	Pyro tube	0.5	0.1	0.01	0.0007	0.0049	0	0.0005	0.001	0.002	0.003		5 ppb
		Air-C2H2						0	0.5	1	2	5		
11	Ni	Pyro tube	0.3	0.02	0.01	0.004	0.028	0	0.002	0.004	0.006	0.010		10 ppb
12	Pb	H D tube	0.2	0.01	0.005	0.0053	0.0371	0	0.005	0.010	0.020	0.030		50 ppb
	Pb	Air-C2H2				1.0	7.0	0	0.20	0.50	1.00	2.00	5.00	
13	Sb	Pyro tube	0.3	0.02	0.002	0.0055	0.0385	0	0.005	0.010	0.020	0.030		50 ppb
14	Zn	Air-C2H2	1	1	0.1	0.11	0.77	0	0.1	0.2	0.5	0.7		

* The concentration range should be 10 - 70 times of 1% absorption

Calibration Curves - How to Prepare 2007/12/4

Necessities

STD for **0.0005 (0.5ppb) , 0.005 (5ppb) , 0.01 (10ppb)**

	ppm			Original conc.	Dilution
	10			1,000ppm	1mL / 100mL DIW
		0.1		10ppm	1mL / 100mL DIW
Cd			0.01	0.1ppm	5mL / 50mL DIW
Mn			0.005	0.1ppm	5mL / 100mL DIW
Ag			0.0005	0.1ppm	1mL / 200mL DIW
Cr					
Ni					

	Item	Qty
100mL	Volumetric flask	2
1mL	One mark pipet	2

+

α

STD for **0.05 (50ppb)**

	ppm			Original conc.	Dilution
Al					
fr	10			1,000ppm	1mL / 100mL DIW
As			0.05	10ppm	1mL / 200mL DIW
Pb					
Sb					

	Item	Qty
100mL	Volumetric flask	1
200mL	Volumetric flask	1
1mL	One mark pipet	2

CC for **0.0005 - 0.005**

	ppm			Original conc.	Dilution
Hg	10			1,000ppm	1mL / 100mL DIW
		0.05		10ppm	1mL / 200mL DIW
			0.005	0.05ppm	10mL / 100mL DIW
			0.002	0.05ppm	2+2mL / 100mL DIW
			0.001	0.05ppm	2mL / 100mL DIW
			0.0005	0.05ppm	1mL / 100mL DIW

	Item	Qty
100mL	Volumetric flask	1
200mL	Volumetric flask	1
250mL	Flask for Hg	4
1mL	One mark pipet	3
2mL	One mark pipet	1
10mL	One mark pipet	1

CC for **0.005 - 0.03**

	ppm			Original conc.	Dilution
	10			1,000ppm	1mL / 100mL DIW
As		0.5		10ppm	5mL / 100mL DIW
hyd			0.005	0.5ppm	1mL / 100mL DIW
			0.010	0.5ppm	2mL / 100mL DIW
			0.020	0.5ppm	4mL / 100mL DIW
			0.025	0.5ppm	5mL / 100mL DIW
			0.030	0.5ppm	6mL / 100mL DIW

	Item		Qty

CC for **0.1 - 1**

	ppm			Original conc.	Dilution
	10			1,000ppm	1mL / 100mL DIW
Zn			0.7	10ppm	5+2mL / 100mL DIW
			0.5	10ppm	5mL / 100mL DIW
			0.2	10ppm	2mL / 100mL DIW
			0.1	10ppm	1mL / 100mL DIW

	Item	Qty
100mL	Volumetric flask	5
1mL	One mark pipet	2
2mL	One mark pipet	1
5mL	One mark pipet	1

CC for **0.5 - 5**

	ppm			Original conc.	Dilution
		5.0		1,000ppm	1mL / 200mL DIW
Ba			2.0	5ppm	40mL / 100mL DIW
Cu			1.0	5ppm	20mL / 100mL DIW
Fe			0.5	5ppm	10mL / 100mL DIW
			(0.25	5ppm	5mL / 100mL DIW)

	Item	Qty
100mL	Volumetric flask	3(4)
200mL	Volumetric flask	1
1mL	One mark pipet	1
(5mL	One mark pipet	1)
10mL	One mark pipet	1
20mL	One mark pipet	1

CC for **1 - 10**

	ppm			Original conc.	Dilution
	10			1,000ppm	2mL / 200mL DIW
Al			4	10ppm	40mL / 100mL DIW
fl			2	10ppm	20mL / 100mL DIW
			1	10ppm	10mL / 100mL DIW

	Item	Qty
100mL	Volumetric flask	3
200mL	Volumetric flask	1
2mL	One mark pipet	1
10mL	One mark pipet	1
20mL	One mark pipet	1

Analysis Administration Sheet

Year/Month

Administration Number (yymm-##)	Representative Name of Samples	Number of Samples	Sample Carry-in		Person in charge for reporting	Final Date of Analysis (dd/mm)
			Date (dd)	Month (mm)		

Signature of person in charge of confirmation of completion

(the director of Damascus DFEA)

Work Flow

1. Administrate Analysis Schedule (Each Person in Charge)
2. Fill in Dates of Final Analyses and attach Front Pages of Analysis Results
3. Submit to the director and get his signature

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Al
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (pyro-tube)
3. Calibration Curve 0, 5 ,10, 20, 30 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Ag
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (HD-tube)
3. Calibration Curve 0, 2 ,4, 6, 10 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item As
2. Method (1) Pretreatment : Sample 40mL + conc.HNO_3 5mL + Heat + Dilute to 40mL
   (2) Analysis : AAS w/ Hydride Vapor Method (D2)
3. Calibration Curve 0, 5 ,10, 20, 40, 50 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Ba
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Flame Method(n2o-c2h2)
3. Calibration Curve 0, 0.5, 1, 2, 5 ppm
4. Remark 2ml nacl/100ml sample

No.	Name of Sample	Concentration or Dilution			Measured Conc. (mg/L)	Final Concentration (mg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Cd
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (HD-tube)
3. Calibration Curve 0, 0.1, 0.2, 0.3, 0.5 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Cr
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (pyro-tube)
3. Calibration Curve 0, 1, 2 , 4, 6 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Cr
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Flame Method (air-C2H2)
3. Calibration Curve 0 , 0.5 , 1, 2 , 5(ppm)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (mg/L)	Final Concentration (mg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Cu
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Flame Method(Ace-Air)
3. Calibration Curve 0, 0.5, 1, 2, 5 ppm
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (mg/L)	Final Concentration (mg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Fe
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Flame Method(Ace-Air)
3. Calibration Curve 0, 0.25, 0.5, 1, 2, 5 ppm
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (mg/L)	Final Concentration (mg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Hg
2. Method (1) Pretreatment : Sample 100mL + Acidify + Heat + Reduct + Dilute to 250mL
   (2) Analysis : AAS w/ Flame Method (Cold vapor)
3. Calibration Curve 0, 0.5, 1, 2, 5 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution Pretreatment (ignore →250mL because calibrations are treated equally)	Measured Conc. (μg/L)	Final Concentration (μg/L)
1		_____ mL ⇒ 100 mL , × _____.		
2		_____ mL ⇒ 100 mL , × _____.		
3		_____ mL ⇒ 100 mL , × _____.		
4		_____ mL ⇒ 100 mL , × _____.		
5		_____ mL ⇒ 100 mL , × _____.		
6		_____ mL ⇒ 100 mL , × _____.		
7		_____ mL ⇒ 100 mL , × _____.		
8		_____ mL ⇒ 100 mL , × _____.		
9		_____ mL ⇒ 100 mL , × _____.		
10		_____ mL ⇒ 100 mL , × _____.		
11		_____ mL ⇒ 100 mL , × _____.		
12		_____ mL ⇒ 100 mL , × _____.		
13		_____ mL ⇒ 100 mL , × _____.		
14		_____ mL ⇒ 100 mL , × _____.		
15		_____ mL ⇒ 100 mL , × _____.		
16		_____ mL ⇒ 100 mL , × _____.		
17		_____ mL ⇒ 100 mL , × _____.		
18		_____ mL ⇒ 100 mL , × _____.		
19		_____ mL ⇒ 100 mL , × _____.		
20		_____ mL ⇒ 100 mL , × _____.		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Mn
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (pyro-tube)
3. Calibration Curve 0, 0.5, 1, 2, 3 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Ni
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (pyro-tube)
3. Calibration Curve 0, 2, 4, 6, 10 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Pb
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (HD-tube)
3. Calibration Curve 0, 5, 10, 20, 30 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Sb
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Furnace Method (pyro-tube)
3. Calibration Curve 0, 5, 10, 20, 30 (ppb)
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (μg/L)	Final Concentration (μg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Front Page of Analysis Results

Administration Number	Representative Name of Samples	Period of Analysis (from pretreatment to the end)	Person in charge of Analysis

1. Item Zn
2. Method (1) Pretreatment : Sample 100mL + conc.HNO_3 5mL + Heat + Dilute to 100mL
   (2) Analysis : AAS w/ Flame Method(Ace-Air)
3. Calibration Curve 0, 0.1, 0.2, 0.5, 0.7 ppm
4. Remark _____

No.	Name of Sample	Concentration or Dilution			Measured Conc. (mg/L)	Final Concentration (mg/L)
		Pretreatment	on AAS	Final Rate		
1		mL ⇒ mL / ×	×	×		
2		mL ⇒ mL / ×	×	×		
3		mL ⇒ mL / ×	×	×		
4		mL ⇒ mL / ×	×	×		
5		mL ⇒ mL / ×	×	×		
6		mL ⇒ mL / ×	×	×		
7		mL ⇒ mL / ×	×	×		
8		mL ⇒ mL / ×	×	×		
9		mL ⇒ mL / ×	×	×		
10		mL ⇒ mL / ×	×	×		
11		mL ⇒ mL / ×	×	×		
12		mL ⇒ mL / ×	×	×		
13		mL ⇒ mL / ×	×	×		
14		mL ⇒ mL / ×	×	×		
15		mL ⇒ mL / ×	×	×		
16		mL ⇒ mL / ×	×	×		
17		mL ⇒ mL / ×	×	×		
18		mL ⇒ mL / ×	×	×		
19		mL ⇒ mL / ×	×	×		
20		mL ⇒ mL / ×	×	×		

Monthly Report of Metal Analysis التقرير الشهري لتحاليل المعادن

Sampling date	20-Jun-07	Administration No. 0706-10	Name of DFEA (or Client)	DAM
Carry-in date	20-Jun-07			

Item	QL	Std-dr /Std-dc	Unit	01 ihda'ashar eea		02 wella		03 dappaghat		04 fa		05 alarabi washing		06 khomasia		07 bab sharqi dying		08 gallab		09 zamzam		10	
Ag	0.002	- / 0.05	mg/l	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002		
Al	0.005	0.2 / 1	mg/l	○	0.077	○	1.6	○	1.8	○	1.8	○	4.4	○	1.2	○	0.79	○	0.50	○	0.092		
As	0.005	0.01 / 0.1	mg/l	○	<0.01	○	<0.01	○	<0.01	○	<0.01	○	<0.01	○	<0.01	○	<0.01	○	<0.01	○	<0.01		
Ba	0.5	0.7 /1	mg/l	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	0.6	○	<0.5	○	<0.5	○	<0.5	○	<0.5		
Cd	0.0001	0.003 / 0.01	mg/l	○	<0.0001	○	<0.0001	○	<0.0001	○	<0.0001	○	0.0019	○	<0.0001	○	<0.0001	○	<0.0001	○	<0.0001		
Cr	0.001	0.05 / 0.5	mg/l	○	<0.5	○	<0.5	○	>5.0	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	<0.5		
Cu	0.5	1 / 1	mg/l	○	1.7	○	1.0	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	<0.5	○	<0.5		
Fe	0.25	1 / 0.3	mg/l	○	1.2	○	1.6	○	21	○	4.6	○	16	○	<0.25	○	0.48	○	0.74	○	<0.25		
Hg	0.0005	0.001 / 0.005	mg/l	○	0.0007	○	0.0008	○	0.0009	○	0.0007	○	0.0010	○	0.0014	○	0.0007	○	0.0006	○	<0.0005		
Mn	0.0005	0.1 / 0.5	mg/l	○	0.013	○	0.013	○	0.050	○	0.019	○	0.064	○	0.0008	○	0.028	○	0.0018	○	0.0005		
Ni	0.002	0.02 / 0.3	mg/l	○	0.012	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	<0.002	○	0.0026	○	<0.002		
Pb	0.005	0.01 / 0.2	mg/l	○	1.4	○	0.50	○	0.021	○	0.038	○	0.43	○	<0.5	○	0.008	○	0.11	○	<0.5		
Sb	0.005	0.02 / 0.3	mg/l	○	<0.005	○	0.005	○	0.077	○	0.006	○	0.055	○	0.005	○	0.008	○	<0.005	○	0.005		
Zn	0.1	1 / 1	mg/l	○	10	○	0.5	○	0.6	○	0.4	○	0.8	○	<0.1	○	0.1	○	0.1	○	<0.1		

← Names of samples

Std-dr : Standards for Drinking Water

Std-dc : Standards for Discharge Water

↑ put [O] for required analysis ضع إشارة O تحاليل المطلوبة

Name of Person in charge of Data Management

To be filled by client تملأ من قبل العميل

Pollution Data Sheet

Pollution Source ID ps999

Name Factory A (example)

Item	Std-dc	Year	2007			2008						2009			meas. / year
		Month	08	10	12	02	04	06	08	10	12	02	04	06	
Ag	0.05	mg/l	0.005					0.003						0.004	1
Al	1	mg/l	0.5			0.6			0.4			0.8			2
As	0.1	mg/l	0.007							0.006					1
Ba	1	mg/l	< 0.5						< 0.5						0.5
Cd	0.01	mg/l	0.008				0.007			0.005			0.008		2
Cr	0.5	mg/l	0.6	0.5	0.7	0.8	0.9	0.4	0.8	0.6	0.6	0.5	0.9	0.6	6
Cu	1	mg/l	< 0.5					< 0.5							0.5
Fe	0.3	mg/l	1.2	1.9	2.3	2.3	1.9	2.8	1.4	2.4	2.8	1.2	2.4	2.8	6
Hg	0.005	mg/l	0.005		0.003		0.006		0.002		0.002		0.006		3
Mn	0.5	mg/l	< 0.0005						< 0.0005						0.5
Ni	0.3	mg/l	< 0.002							< 0.002					0.5
Pb	0.2	mg/l	< 0.005						< 0.005						0.5
Sb	0.3	mg/l	0.004				0.004						0.005		1
Zn	1	mg/l	< 0.1							< 0.1					0.5

Daily Report & Instruments Check List

year / month ____________________

Date	AAS		Pretreatment				Attendant	Remark / Instrument Status / Consumables
	Element-Method	Status	Normal	Al	As	Hg		

Name of Reagent Potassium permanganate, $KMnO_4$

Specification extra pure / trace analysis grade

Unit 500g

Date	Purchased	Consumed / Opened	Stock (No. or Amount)	Personnel	Remark

Name of Reagent Potassium persulfate, $K_2S_2O_8$

Specification extra pure / trace analysis grade

Unit 500g

Date	Purchased	Consumed / Opened	Stock (No. or Amount)	Personnel	Remark

Name of Reagent Standard Solution for Ag, 500mL

Date	Purchased	Consumed / Opened	Stock (No. or Amount)	Personnel	Remark
3/12/2006	1		1	Kimura, Muthana	

Name of Reagent Standard Solution for Al, 500mL

Date	Purchased	Consumed / Opened	Stock (No. or Amount)	Personnel	Remark
3/12/2006	1		1	Kimura, Muthana	

Name of Reagent Standard Solution for As, 500mL

Date	Purchased	Consumed / Opened	Stock (No. or Amount)	Personnel	Remark
3/12/2006	1		1	Kimura, Muthana	

Item	P/N	Qty			
		Aug-07	Nov-07	Feb-08	May-08
Graphite Tube , Pyrolytic	64F0840510	22			
Platform Tube	64F9530505	8			
Graphite Tube , Pyrolytic	64F1770310	8			
Graphite Tube HD	64F1760310	2			
Sample Cup	64F1750608	200			
Tube ET-16	64F3750608	155			
Vapor Separetor	64F7090701	1			
Quartz Tube T Shape	64F8120506	2			
Nebulizer Assy	64F4380612	1			
Lamp D2 L6382 D2F6382	64F6510701	1			
Tube Fluor 1000mm	65F5640612	1			
O-Ring 4D	6596770608	1			
O-Ring 4DP16	6595400604	1			
O-Ring 4DP35	6596140606	1			
Graphite Holder	64F5170611	1			
Graphite Cap	64F5690612	1			
Reaction Coil Assy	64F4010611	1			
Fuse		8			
Rubber plug for Reaction Vessel Glass Tube for Reaction , Longer Glass Tube for Reaction , Shorter		1 one set			
Pump Tube 080 (for reagent)HVG		4			
Pump Tube 130 (for sample) HVG		2			
Nozzle Assy HVG	64F0760608	1			
Suction Tube (for sample)HVG		1			

Person in Charge		Sohad Reem			

Periodical Maintenance Check Sheet (2007)

ورقة التحقق من الصيانة الدورية لعام 2007

The date of maintenance

تاريخ الصيانة

month	Mar	May	Jul	Sep	Nov	الشهر
date						اليوم

*** The date will be set by consultation between Lab. Staff and Al-Shahba (Tel. 011-444-1019). Al-Shahba must contact Lab. Staff (Mr. Talaat Harb) in the previous month. The maintenance should be held in the first half of the month.**

يجب أن يتم تحديد تاريخ الصيانة بالتشاور ما بين طاقم المخبر و شركة شهبا
يجب على شركة شهبا الاتصال مع طاقم المخبر في الشهر السابق للصيانة
يجب أن تتم الصيانة في النصف الأول من الشهر

1) Burner maintenance

- **Cleaning the burner head**
  - ☐ **check**
- **Cleaning the nebulizer and the tube (the tube should be replaced as necessary)**
  - ☐ **check**
- **Cleaning the chamber**
  - ☐ **check**

2) Furnace maintenance

- **Cleaning graphite cap, holder, window plate sockets and window plates**
  - ☐ **check**
- **Cleaning the temperature sensor**
  - ☐ **check**
- **Cleaning the slide mechanism**
  - ☐ **check**
- **Cleaning the seal**
  - ☐ **check**

3) Atomizer positioning adjustment

- **Burner positioning adjustment**
  - ☐ **check**
- **Furnace positioning adjustment**
  - ☐ **check**

4) Replacing the deuterium lamp as necessary

☐ **check**

5) Maintenance following Standard Installation Completion Report (format : ZEAF-1055D)

☐ **attach the format, raw data sheet and check**

Date of the maintenance
تاريخ الصيانة

_____

Name of the person in charge of the maintenance
اسم الشخص المسؤول عن الصيانة

_____

Name of the lab. staff in attendance
اسم الشخص الموجود في المخبر

_____

→ Keep this in the file.

للحفظ في ملف

Annex 2-2:
Recording Documents

2.2.4 Air Quality

Recording Documents -01
Sampling and Analysis Record for Air Quality Analysis

Air Quality Analysis

Sampling record

Investigation subject :

Sampling date : ( )

(Person in charge :)

Measurement point (Weather)		( )	( )	( )	( )
Temperature (℃)					
Sampling Time	Start	:	:	:	:
	Stop	:	:	:	:
Abs. liquid volume (ml)					
Suction flow (l/min)	Start	:	:	:	:
	Stop	:	:	:	:
Total flow quantity (l)					
Notes: (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Sampling record

Investigation subject :

Sampling date : ( )

(Person in charge :)

Measurement point (Weather)		( )	( )	( )	( )
Temperature (℃)					
Sampling Time	Start	:	:	:	:
	Stop	:	:	:	:
Abs. liquid measure (ml)					
Suction flow (l/min)	Start	:	:	:	:
	Stop	:	:	:	:
Total flow quantity (l)					
Notes: (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Hi-Vol. (PM10, TSP)　Sampling record

Investigation subject :
Sampling date : ＿＿＿＿＿＿＿＿＿＿（　　）
Weather :　　（Person in charge :　　）

Measurement point					
Filter No.					
Temperature（℃）					
Sampling time	Start	/　:	/　:	/　:	/　:
	Stop	/　:	/　:	/　:	/　:
Total suction time (min)					
Suction flow (m^3/min)	Start				
	Stop				
Total flow quantity (m^3)					
Notes （Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.）					

Hi-Vol. (PM10, TSP)　Sampling record

Investigation subject :
Sampling date : ＿＿＿＿＿＿＿＿＿＿（　　）
Weather :　　（Person in charge :　　）

Measurement point					
Filter No.					
Temperature（℃）					
Sampling time	Start	/　:	/　:	/　:	/　:
	Stop	/　:	/　:	/　:	/　:
Total suction time (min)					
Suction flow (m^3/min)	Start				
	Stop				
Total flow quantity (m^3)					
Notes （Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.）					

Low-Vol. (PM10)　Sampling record

Investigation subject :
Sampling date : _____ (　　)
Weather :　　(Person in charge :　　)

Measurement point					
Filter No.					
Temperature (℃)					
Sampling time	Start	/ :	/ :	/ :	/ :
	Stop	/ :	/ :	/ :	/ :
Total suction time (min)					
Suction flow (L/min)					
Total flow quantity (m^3)					
Notes (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Low-Vol. (PM10)　Sampling record

Investigation subject :
Sampling date : _____ (　　)
Weather :　　(Person in charge :　　)

Measurement point					
Filter No.					
Temperature (℃)					
Sampling time	Start	/ :	/ :	/ :	/ :
	Stop	/ :	/ :	/ :	/ :
Total suction time (min)					
Suction flow (L/min)					
Total flow quantity (m^3)					
Notes (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Dust fall　Sampling record

Investigation subject :

Sampling date : ____________________ (　　　　)

Weather :　　　　　　　　　　　　　　　　(Person in charge :　　　　　　　　)

Measurement point					
Sampling day	Start	/	/	/	/
	Stop	/	/	/	/
Leaving days (days)					
Notes (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Sampling date : ____________________ (　　　　)

Weather :　　　　　　　　　　　　　　　　(Person in charge :　　　　　　　　)

Measurement point					
Sampling day	Start	/	/	/	/
	Stop	/	/	/	/
Leaving days (days)					
Notes (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

Sampling date : ____________________ (　　　　)

Weather :　　　　　　　　　　　　　　　　(Person in charge :　　　　　　　　)

Measurement point					
Sampling day	Start	/	/	/	/
	Stop	/	/	/	/
Leaving days (days)					
Notes (Situations of a wind direction, wind velocity, and a near source of pollution, etc. are described.)					

$$\text{Dust fall ((kg/km}^2\text{/ month)} = \frac{W}{\frac{\pi}{4} \times D2} \times 10^4 = 1.274 \times \frac{W}{D2} \times 10^4$$

W :　Weight of collection (g)

D :　Inside diameter of collection container (cm)

$\because$ g : m^2 ∽ ton : km^2

Nitrogen oxide (NOx) analytical result

Investigation subject :

Sampling date : _____ (　　)

(Person in charge :　　)

No.	Measurement point	Absorption liquid (ml)	Total flow quantity (l)	Absorbance (-logT)		Concentration (ppm or μg/m³)			Note
				NO_2	NO	NO_2	NO	NO_2+NO	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Absorbance factor (M) = _____ (μL NO_2 or μg NO_2 / Abs. 1)

Nitrogen oxide (NOx) analytical result

Investigation subject :

Sampling date : _____ (　　)

(Person in charge :　　)

No.	Measurement point	Absorption liquid (ml)	Total flow quantity (l)	Absorbance (-logT)		Concentration (ppm or μg/m³)			Note
				NO_2	NO	NO_2	NO	NO_2+NO	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Absorbance factor (M) = _____ (μL NO_2 or μg NO_2 / Abs. 1)

Sulfur dioxide (SO_2) analytical result

Investigation subject :

Sampling date : _____ ( )

(Person in charge :)

No.	Measurement point	Absorption liquid (ml)	Total flow quantity (l)	Absorbance (-logT)	SO_2 Concentration (ppm or μg/m³)	Note
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

The SO_2 concentration depends on the proportion calculation of the standard (μL SO_2 or μg SO_2) and the sample.

Sulfur dioxide (SO_2) analytical result

Investigation subject :

Sampling date : _____ ( )

(Person in charge :)

No.	Measurement point	Absorption liquid (ml)	Total flow quantity (l)	Absorbance (-logT)	SO_2 Concentration (ppm or μg/m³)	Note
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

The SO_2 concentration depends on the proportion calculation of the standard (μL SO_2 or μg SO_2) and

the sample.

The following monthly report is being made about Humidity, Temperature, Wind Velocity, Wind Direction and Solar Radiation.
This monthly report is made automatically by the equation.

<Atmospheric environment monthly report>

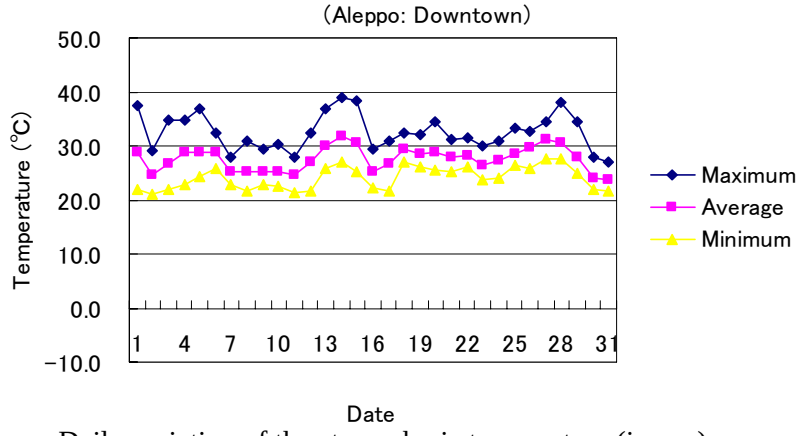
July, 2006 (Time zone: 1hr-24hr Example Data
Monitoring Station: Downtown (The Archaeological Museum) Measurement item: Humidity Unit: %

hour / date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Sum	Max.	Min.	Average	Me'd No.*1	Defec. No.*2
1	83	82	83	85	79	75	72	66	59	50	45	41	41	37	36	36	37	39	41	43	45	48	47	48	1318	85	36	55	24	0
2	40	48	50	53	52	52	53	53	55	53	49	46	37	33	36	43	48	50	55	54	53	58	62	61	1194	62	33	50	24	0
3	74	76	75	75	73	75	73	72	65	52	46	33	32	30	44	48	52	54	55	56	56	56	57	57	1386	76	30	58	24	0
4	49	49	50	50	50	50	51	50	48	44	38	33	28	35	40	44	45	55	58	60	62	65	66	67	1187	67	28	49	24	0
5	48	48	50	53	52	52	53	53	55	44	42	33	30	28	25	35	48	50	55	62	63	63	62	61	1165	63	25	49	24	0
6	60	55	50	53	52	52	53	53	48	53	49	46	47	44	48	51	52	55	61	62	63	63	62	61	1293	63	44	54	24	0
7	49	49	50	50	50	50	51	50	48	40	35	30	25	24	28	35	40	48	50	55	62	65	66	67	1117	67	24	47	24	0
8	60	55	52	51	50	48	48	48	44	40	38	35	30	26	33	39	40	39	39	42	44	46	55	58	1060	60	26	44	24	0
9	55	50	50	48	43	42	43	43	41	39	36	34	31	27	22	27	29	35	40	45	50	55	65	75	1025	75	22	43	24	0
10	80	80	80	78	77	76	70	60	55	50	44	22	16	16	19	21	21	33	35	40	48	55	58	63	1197	80	16	50	24	0
11	60	54	53	53	53	53	53	53	58	56	54	53	52	50	53	54	53	58	66	78	84	86	88	87	1462	88	50	61	24	0
12	73	85	91	92	90	86	80	70	68	70	70	68	66	65	60	61	65	70	74	73	74	70	65	60	1746	92	60	73	24	0
13	57	52	52	51	50	48	48	48	44	40	38	35	35	35	36	39	40	39	39	42	44	46	48	49	1055	57	35	44	24	0
14	49	49	50	50	50	50	51	50	48	44	43	38	33	38	44	48	55	55	58	60	62	65	66	67	1223	67	33	51	24	0
15	64	79	76	68	69	69	65	62	60	59	66	55	42	40	42	48	52	56	60	53	55	58	60	65	1423	79	40	59	24	0
16	60	55	50	53	52	52	53	53	55	53	44	42	38	36	38	48	52	55	61	62	63	63	62	61	1261	63	36	53	24	0
17	66	60	57	57	56	56	56	50	45	44	42	38	36	32	38	45	54	53	55	56	54	60	68	68	1246	68	32	52	24	0
18	65	60	66	54	55	48	43	49	52	53	51	40	35	30	33	28	38	44	56	60	61	61	59	60	1201	66	28	50	24	0
19	42	45	55	58	60	69	78	81	75	75	70	64	59	54	47	49	53	56	57	58	62	61	55	47	1430	81	42	60	24	0
20	40	41	42	44	44	44	43	40	40	39	40	48	65	70	73	70	74	75	78	79	78	76	70	68	1381	79	39	58	24	0
21	70	76	75	75	73	75	73	66	65	48	42	38	29	30	36	48	52	54	55	56	56	56	57	57	1362	76	29	57	24	0
22	48	48	50	53	52	52	53	53	50	46	45	40	42	49	50	51	52	55	61	62	63	63	62	61	1261	63	40	53	24	0
23	58	58	60	63	65	68	65	62	59	48	52	55	50	48	42	56	75	74	60	44	41	45	48	48	1344	75	41	56	24	0
24	58	60	57	57	56	56	56	56	56	57	46	44	38	32	26	28	39	48	58	64	64	68	78	70	1272	78	26	53	24	0
25	66	52	57	58	59	47	50	50	49	50	45	40	36	33	38	44	50	55	58	59	61	63	66	68	1254	68	33	52	24	0
26	70	58	60	63	65	78	70	68	68	65	60	58	55	48	42	56	56	57	55	54	52	50	45	38	1391	78	38	58	24	0
27	42	41	41	42	43	42	43	43	41	35	33	29	28	25	20	21	23	29	32	35	37	40	41	41	847	43	20	35	24	0
28	46	52	57	58	59	47	50	50	49	50	48	45	48	50	49	51	56	58	58	59	61	63	66	72	1302	72	45	54	24	0
29	66	60	57	57	56	56	56	56	56	57	56	58	60	60	61	63	63	63	63	64	64	68	78	80	1478	80	56	62	24	0
30	74	76	75	75	73	75	73	72	65	52	46	43	38	40	44	48	52	54	55	56	56	56	57	57	1412	76	38	59	24	0
31	58	58	60	63	65	78	78	70	64	52	46	44	40	38	42	51	66	70	60	44	41	40	40	38	1306	78	38	54	24	0
Sum	1830	1811	1831	1840	1823	1821	1804	1750	1685	1558	1459	1328	1242	1203	1245	1386	1532	1636	1708	1737	1779	1832	1879	1880	39599					
Maximum	83	85	91	92	90	86	80	81	75	75	70	68	66	70	73	70	75	75	78	79	84	86	88	87		92				
Minimum	40	41	41	42	43	42	43	40	40	35	33	22	16	16	19	21	21	29	32	35	37	40	40	38			16			
Average	59	58	59	59	59	59	58	56	54	50	47	43	40	39	40	45	49	53	55	56	57	59	61	61				53		
Me'd No.*1	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31					744	
Defec. No.*2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						0

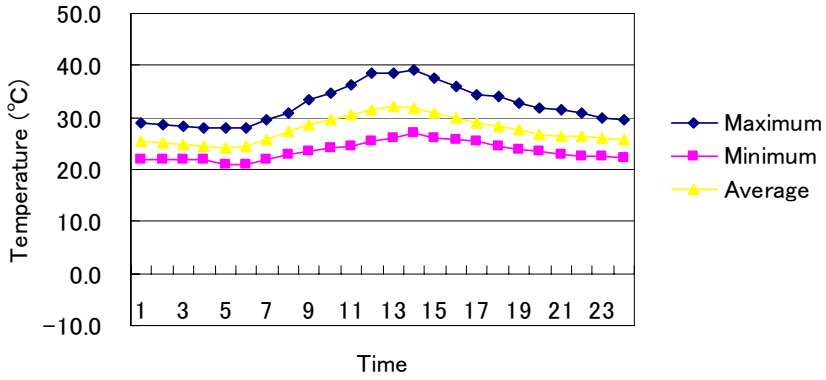
*1 Me'd No. : Number of measured datas Effective measurement d..... 31 The highest value of daily 72.8
*2 Defec. No.: Number of defective datas Ineffectual measurement ..... 0 The lowest value of daily 35.3
Average of daily maximun 71.8

The following figure and table is being made about Humidity, Temperature, Wind Velocity, Wind Direction and Solar Radiation.

This figure and a table are made automatically as well as the monthly report.

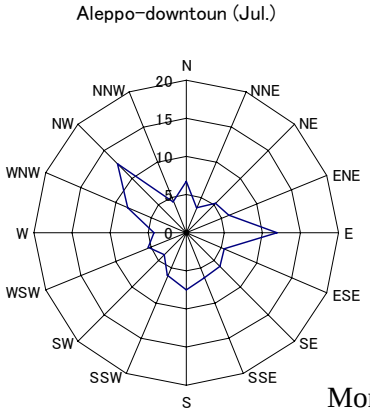


Daily variation of the atmospheric temperature (image)



Monthly average time variation of the atmospheric temperature (image)

Direction	16 N	1 NNE	2 NE	3 ENE	4 E	5 ESE	6 SE	7 SSE	8 S	9 SSW	10 SW	11 WSW	12 W	13 WNW	14 NW	15 NNW	17 Calm	Total
Frequency	47	26	38	42	83	38	44	44	52	43	28	38	29	58	88	31	15	697
Ratio (%)	6.7	3.7	5.5	6.0	11.9	5.5	6.3	6.3	7.5	6.2	4.0	5.5	4.2	8.3	12.6	4.4	2.2	100
WV (m/s)	1.3	1.4	1.3	1.1	1.3	1.3	1.4	1.5	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3	0.2	



Monthly wind rose (image)

Recording Documents -04

Sampling Record of Passive Sampler for Air Quality Analysis

Air Quality Analysis

Sampling Record of Passive Sampler (NOx)

Person in charge : _____

Weather : _____ **Temperature :** _____℃ **Relative Humidity :** _____%

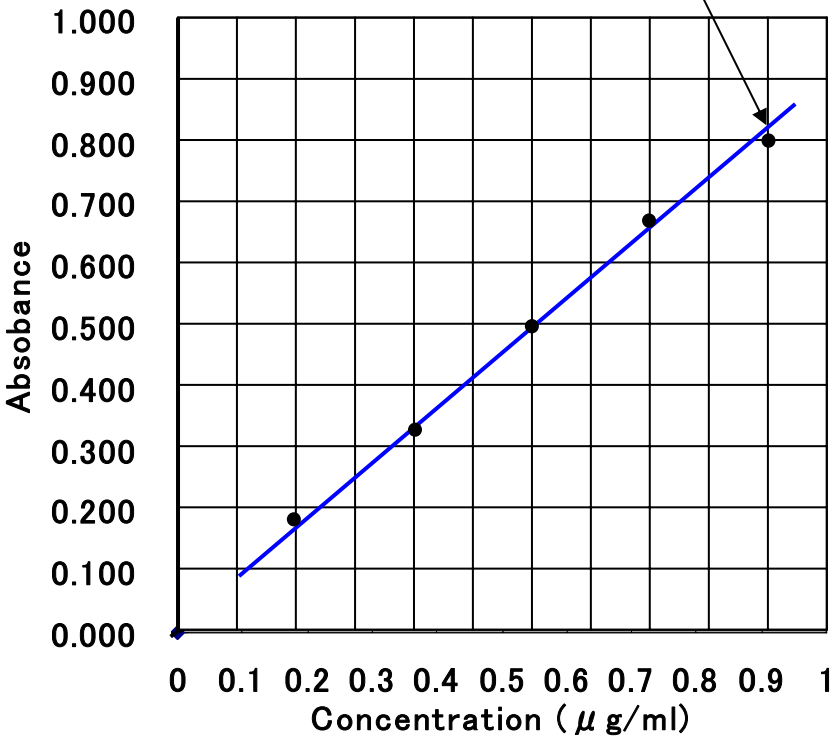
Sampling point	Sampling period		Sampling time (min)	Description (Address and special note, etc.)
	Setting time	Collection time		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		
	/ :	/ :		

A standard curve is made automatically by inputting absorbance to the next table.
And, when sampling time and absorbance are inputted to the calculation table (Calculation of NOx, NO2, and NO concentration), the concentration of NO, NO2 and NOx is calculated automatically.

Preparing the Standard Curve for NO, NO2 and NOx

Concentration of Standard NO_2 Solution (µg/ml)		Absorbance			Slope
x	x^2	y	$y - y_0$	$x (y - y_0)$	$\frac{\Sigma x (y-y_0)}{\Sigma x^2}$
(1)	(1) x (1)	*****	A	(1) x A	(9) / (8)
0	0	(2)			
0.1	0.01	(3)	(3) – (2)		
0.2	0.04	(4)	(4) – (2)		
0.4	0.16	(5)	(5) – (2)		
0.6	0.36	(6)	(6) – (2)		
0.8	0.64	(7)	(7) – (2)		
*****	Σx^2	*****	*****	$\Sigma x(y-y_0)$	(9) / (8)
	(8) 1.21			(9)	G

It appears automatically.



Standard Curve for NO, NO2 and NOx

Calculation of Concentration Data For NOx , NO2 and NO

(Calculation of basic data)

Compound	Blank Absorbance			Average	Slope of the Standard Curve	Temperature (ºC)	Relative Humidity (%)	Concentration Conversion Coefficient (ppb·min/ ng)	
	B1	B2	B3					αNO_2	αNO
NOx				(1)=	G =	(20ºC)	(70%)	α_{NO2} = (56)	α_{NO} = (60)
NO_2				(2)=				α_{NO2} =	α_{NO} =

α_{NO2} = 56 and α_{NO} = 60 when Temperature = 20ºC and Relative Humidity = 70%.
Please refer to the attached paper for other combinations of the temperature and the relative humidity.

(Calculation of NOx, NO2, and NO concentration)

	Specification			Samples							
	Sample Number										
	Sample Location										
	Sampling Time (min)	(3)	=(3)								
NOx	Sample Absorbance	(4)	=(4)								
	Absorbance	(5)	= (4) – (1)								
	Solution Concentration (µg/ml)	(6)	= (5) / G								
	Collected Weight (ng)	(7)	= (6) x 8 x 1000								
	Concentration (PPB)	(8)	= (13) + (15)								
NO_2	Sample Absorbance	(9)	= (9)								
	Absorbance	(10)	= (9) – (2)								
	Solution Concentration (µg/ml)	(11)	= (10) / G								
	Collected Weight (ng)	(12)	= (11) x 8 x 1000								
	Concentration (PPB)	(13)	= α_{NO2} x (12) / (3)								
NO	Collected Weight (ng)	(14)	= (7) – (12)								
	Concentration (PPB)	(15)	= α_{NO} x (14) / (3)								

α_{NO} and α_{NO2} as a Function of Temperature and Relative Humidity

Temperature (°C)	R. H. (%)	α_{NO2}	α_{NO}	Temperature (°C)	R. H. (%)	α_{NO2}	α_{NO}
-10	50	84	61	16	70	58	62
-9	50	83	61	17	70	57	62
-8	50	81	61	18	70	57	61
-7	50	80	61	19	70	57	61
-6	50	79	61	20	70	56	60
-5	50	78	61	21	70	56	60
-4	50	77	61	22	70	56	60
-3	50	76	60	23	70	55	59
-2	50	75	60	24	70	55	59
-1	50	74	60	25	80	53	61
0	50	74	60	26	80	52	61
1	60	68	64	27	80	52	60
2	60	68	63	28	80	52	60
3	60	67	63	29	80	52	59
4	60	66	63	30	80	52	59
5	60	66	63	31	80	52	58
6	60	65	62	32	80	51	58
7	60	65	62	33	80	51	57
8	60	64	62	34	80	51	57
9	60	64	61	35	80	50	57
10	60	63	61	36	80	50	56
11	60	63	61	37	80	50	56
12	60	62	60	38	80	50	56
13	60	62	60	39	80	49	55
14	60	61	60	40	80	49	55
15	70	58	63				

Note R.H. : Relative Humidity

List of the Sampling Points for NO_2 Measurement in _____

(- January 2006)

Sample No.	Description

Annex 2-2:
Recording Documents

2.2.5 Data Management

شكل السجل لتحليل جودة الهواء (لمديرية البيئة في حمص)

Recording Format for Air Quality Analysis (for Homs DFEA)

الرمز Code		المحافظة Governorate	المدينة City	البلدة Town	القرية Village
		السنة Year	وصف موقع الاعتيان: Sampling site description		

بدء الاعتيان Start of sampling		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)		/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل avg.
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)		:	:	:	:	:	:	:	:	:	:	:	:			
نهاية الاعتيان End of sampling		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)		/	/	/	/	/	/	/	/	/	/	/	/			
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)		:	:	:	:	:	:	:	:	:	:	:	:			
		مدة الاعتيان (ساعة) Sampling duration (hours)														0.0	0.0	#DIV/0!
المادة Item		**طريقة الاعتيان Sampling Method**	**الوحدة Unit**	**Quantitation Limits**														
الطقس weather		يدوي manual	المرجع في الأسفل ref. below	--														
اتجاه الريح wind direction		مقياس اتجاه الريح wind direction meter	درجة degree	1°												0	0	#DIV/0!
سرعة الريح wind speed		مقياس سرعة الريح wind speed meter	km/h	1 km/h												0	0	#DIV/0!
SO_2	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
SO_2	(Gas)	أداة اعتيان بسيطة simple sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
NO_2	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
NO_2	(Gas)	أداة اعتيان بسيطة simple sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
NOx	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
NOx	(Gas)	أداة اعتيان بسيطة simple sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
O_3	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
NH_3	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
F	(Gas)	أداة اعتيان محمولة باليد handy sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
TSP	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير TSP HV sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
PM10	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير PM10 PM10 HV sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
PM10	(Particulate)	جهاز اعتيان الهواء ذي التدفق الصغير PM10 PM10 LV sampler	$\mu g/m^3$	1 $\mu g/m^3$												0	0	#DIV/0!
Pb	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير/جهاز الامتصاص الذري HV sampler/AAS	$\mu g/m^3$													0	0	#DIV/0!
الغبار المتساقط Dustfall	مواد منحلة Soluble	حاوية الغبار	$ton/km^2/month$	1ton/km^2/month												0.0	0.0	#DIV/0!
	مواد غير منحلة Insoluble	Dust jar		1 ton/km^2/month												0.0	0.0	#DIV/0!

المرجع: صف حالة الجو خلال الاعتيان وعند نقطة الاعتيان مشيرا إلى التالي:
صحو/مشمس، غائم، ماطر (خفيف)، ماطر (بشدة)
إذا كان الاعتيان لأكثر من يوم، صف الوضع قدر استطاعتك
مثال: المطر الشديد الذي يلحقه شمس يمكن وصفه على الشكل التالي ▲/◎

Guide: Describe the weather about sampling period at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲
if sampling period is more than one day, describe to the extent you can do.
ex) heavy rain followed by sunny can be described as▲/◎

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل لتحليل جودة الهواء (لمديريات البيئة في دمشق، حلب)

Recording Format for Air Quality Analysis (for Damascus and Aleppo DFEAs)

الرمز Code	المحافظة Governorate	المدينة City	البلدة Town	القرية Village
	السنة Year	وصف موقع الاعتيان: Sampling site description		

المادة Item		طريقة الاعتيان Sampling Method	الوحدة Unit	Quantitation Limits													الأدنى min.	الأقصى max.	المعدل avg.
بدء الاعتيان Start of sampling		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/			
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:			
نهاية الاعتيان End of sampling		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/			
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:			
مدة الاعتيان (ساعة) Sampling duration (hours)																	0.0	0.0	#DIV/0!
الطقس weather		يدوي manual	المرجع في الأسفل ref. below	--															
اتجاه الريح wind direction		مقياس اتجاه الريح wind direction meter	درجة degree	1°													0	0	#DIV/0!
سرعة الريح wind speed		مقياس سرعة الريح wind speed meter	km/h	1 km/h													0	0	#DIV/0!
SO_2	(Gas)	أداة اعتيان محمولة باليد handy sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
SO_2	(Gas)	أداة اعتيان بسيطة simple sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
NO_2	(Gas)	أداة اعتيان محمولة باليد handy sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
NO_2	(Gas)	أداة اعتيان بسيطة simple sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
NOx	(Gas)	أداة اعتيان محمولة باليد handy sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
NOx	(Gas)	أداة اعتيان بسيطة simple sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
O_3	(Gas)	أداة اعتيان محمولة باليد handy sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
NH_3	(Gas)	أداة اعتيان محمولة باليد handy sampler	ppm	0.001ppm													0.000	0.000	#DIV/0!
TSP	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير TSP HV sampler	$\mu g/m^3$	1 $\mu g/m^3$													0	0	#DIV/0!
PM10	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير PM10 PM10 HV sampler	$\mu g/m^3$	1 $\mu g/m^3$													0	0	#DIV/0!
PM10	(Particulate)	جهاز اعتيان الهواء ذي التدفق الصغير PM10 PM10 LV sampler	$\mu g/m^3$	1 $\mu g/m^3$													0	0	#DIV/0!
Pb	(Particulate)	جهاز اعتيان الهواء ذي التدفق الكبير/جهاز الامتصاص الذري HV sampler/AAS	$\mu g/m^3$														0	0	#DIV/0!
الغبار المتساقط Dustfall	مواد منحلة Soluble	حاوية الغبار Dust jar	$ton/km^2/month$	1ton/km^2/month													0.0	0.0	#DIV/0!
	مواد غير منحلة Insoluble			1 ton/km^2/month													0.0	0.0	#DIV/0!

المرجع: صف حالة الجو خلال الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس، غائم، ماطر (خفيف)، ماطر (بشدة)
إذا كان الاعتيان لأكثر من يوم، صف الوضع قدر استطاعتك
مثال: المطر الشديد الذي يلحقه شمس يمكن وصفه على الشكل التالي ▲/◎

Guide: Describe the weather about sampling period at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲
if sampling period is more than one day, describe to the extent you can do.
ex) heavy rain followed by sunny can be described as ▲/◎

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الأساسي للمياه وتحاليل المياه البيولوجية والكيميائية 1 (دمشق)

Recording Format for Chemical & Biological, Metal and Basic Water Analysis (Damascus DFEA)

	الرمز Code	المحافظة Governorate			المدينة City			البلدة Town						القرية Village							
		نهر/ بحيرة/ معمل River/Lake/Factory												وصف موقع الاعتيان: Sampling site description							
		السنة Year																			
		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:	:			
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**	**Quantitation Limits**																
Basic Information	الطقس weather	يدوي manual	المرجع في الاسفل ref. below		--																
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1													0.0	0.0	#DIV/0!	
	عرض المياه water width	يدوي manual	m		--													0	0	#DIV/0!	
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--													0.0	0.0	#DIV/0!	
	نسبة الجريان flow rate	يدوي manual	l/s		--													0.0	0.0	#DIV/0!	
	الرائحة odor	يدوي manual	-		--																
Basic Water Analysis	pH	pH meter	-	السطح	0.1													0.0	0.0	#DIV/0!	
	درجة حرارة المياه .Water Temp	pH meter	℃	السطح	0.1													0.0	0.0	#DIV/0!	
	اللون Color	portable colorimeter	-	السطح	25													0	0	#DIV/0!	
	Total dissolved solids (TDS)	portable EC/TDS meter	mg/l	السطح	1													0	0	#DIV/0!	
	DO	portable DO meter	mg/l	السطح	0.05													0.00	0.00	#DIV/0!	
	Total suspended solids (SS)	portable colorimeter	mg/l	السطح	22.1													0.0	0.0	#DIV/0!	
	COD	colorimeter	mg/l	السطح	4(Low) 30(High)													0	0	#DIV/0!	
	BOD_5	culture	mg/l	السطح	1													0	0	#DIV/0!	
	NO_3^-	portable colorimeter	mg/l	السطح	0.2(Low) 0.8(High)													0.0	0.0	#DIV/0!	
	PO_4^{3-}	portable colorimeter	mg/l	السطح	0.05(Low) 0.14(High)													0.00	0.00	#DIV/0!	
	Cl^-	Digital Titrator	mg/l	السطح	10													0	0	#DIV/0!	
	NH_3-N	portable colorimeter	mg/l	السطح	0.08(Low) 1(High)													0.0	0.0	#DIV/0!	
	الناقلية الكهربائية Electrical Conductivity	portable EC/TDS meter	µS/cm	السطح	1													0	0	#DIV/0!	
	العكارة Turbidity	portable turbidity meter	NTU	السطح	0.01													0.0	0.0	#DIV/0!	
Chemical and Biological Analiysis 1	pH	Labo pH meter	-	السطح	0.1													0.0	0.0	#DIV/0!	
	COD_{Cr}	potassium dichromate	mg/l	السطح	1.0 (Low) 1 (High)													0.0	0.0	#DIV/0!	
	PO_4^{3-}	Spectral photometric	mg/l	السطح	0.02													0.00	0.00	#DIV/0!	
	Cl^-	Ion Select Electrobe	mg/l	السطح	3.55													0.0	0.0	#DIV/0!	
	NH_3-N	Spectral photometric	mg/l	السطح	0.02													0.00	0.00	#DIV/0!	
	NO_3^--N	Ion Select Electrobe	mg/l	السطح	0.6													0.0	0.0	#DIV/0!	
	الزيت & الشحم Oil & grease	Solvent extraction	mg/l	السطح	0.1													0.0	0.0	#DIV/0!	
	Total suspended solids (SS)	Filtrate weigh	mg/l	السطح														0.0	0.0	#DIV/0!	
	المعلقات المستقرة Settleable solids	Filtrate weigh	mg/l	السطح														0.0	0.0	#DIV/0!	
	Fluorides (F^-)	Ion Select Electrobe	mg/l	السطح	0.02													0.00	0.00	#DIV/0!	
	Sulfide (S^{2-})	Ion Select Electrobe	mg/l	السطح	0.005													0.00	0.00	#DIV/0!	
	خافض للتوتر السطحي Surfactants	Spectral photometric	mg/l	السطح	0.002													0.000	0.000	#DIV/0!	
	العدد الكلي لمجموعة المستعمرات Total count of the colony group	colony counter	MPN/100ml	السطح	1													0.0	0.0	#DIV/0!	
	Chromiumu, Hexavalent Cr(VI)	Spectral photometric	mg/l	السطح	0.01													0.00	0.00	#DIV/0!	
	Chromiumu, Total (T-Cr)	Spectral photometric	mg/l	السطح	0.01													0.00	0.00	#DIV/0!	
	Cyan (CN^-)	Ion Select Electrobe	mg/l	السطح	0.13													0.00	0.00	#DIV/0!	

شكل السجل للتحليل الأساسي للمياه وتحاليل المياه البيولوجية والكيميائية 1 (دمشق)

Recording Format for Chemical & Biological, Metal and Basic Water Analysis (Damascus DFEA)

Basic Information	الرمز Code	المحافظة Governorate			المدينة City				البلدة Town				القرية Village								
		نهر/ بحيرة/ معمل River/Lake/Factory											وصف موقع الاعتيان: Sampling site description								
		السنة Year																			
		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:	:			
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**	**Quantitation Limits**																
	الطقس weather	يدوي manual	المرجع في الاسفل ref. below		--																
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1													0.0	0.0	#DIV/0!	
	عرض المياه water width	يدوي manual	m		--													0	0	#DIV/0!	
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--													0.0	0.0	#DIV/0!	
	نسبة الجريان flow rate	يدوي manual	l/s		--													0.0	0.0	#DIV/0!	
	الرائحة odor	يدوي manual	-		--																
Metal Analysis	Ag	Pretreat(HNO3)-AAS	mg/l		0.002													0.000	0.00	#DIV/0!	
	Al	Pretreat(HNO3)-AAS	mg/l		0.005													0.000	0.00	#DIV/0!	
	As	Hydride Vapor-AAS	mg/l		0.005													0.00	0.00	#DIV/0!	
	Ba	Pretreat(HNO3)-AAS	mg/l		0.5													0.0	0.0	#DIV/0!	
	Cd	Pretreat(HNO3)-AAS	mg/l		0.0001													0.0000	0.000	#DIV/0!	
	Cr	Pretreat(HNO3)-AAS	mg/l		0.001													0.000	0.000	#DIV/0!	
	Cu	Pretreat(HNO3)-AAS	mg/l		0.5													0.0	0.0	#DIV/0!	
	Fe	Pretreat(HNO3)-AAS	mg/l		0.25													0.00	0.00	#DIV/0!	
	Hg	Reduction Vapor-AAS	mg/l		0.0005													0.000	0.00	#DIV/0!	
	Mn	Pretreat(HNO3)-AAS	mg/l		0.0005													0.000	0.00	#DIV/0!	
	Ni	Pretreat(HNO3)-AAS	mg/l		0.002													0.000	0.00	#DIV/0!	
	Pb	Pretreat(HNO3)-AAS	mg/l		0.005													0.000	0.00	#DIV/0!	
	Sb	Pretreat(HNO3)-AAS	mg/l		0.005													0.000	0.00	#DIV/0!	
	Zn	Pretreat(HNO3)-AAS	mg/l		0.1													0.0	0.0	#DIV/0!	

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Guide: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الأساسي للمياه وتحاليل المياه البيولوجية والكيميائية 1 (دمشق)

Recording Format for Chemical & Biological and Basic Water Analysis (Damascus DFEA)

Basic Information	الرمز Code		المحافظة Governorate			المدينة City			البلدة Town									القرية Village					
			نهر / بحيرة/ معمل River/Lake/Factory															وصف موقع الاعتيان: Sampling site description					
			السنة Year																				
			تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.			
			وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:	:						
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**	**Quantitation Limits**																		
	الطقس weather	يدوي manual	المرجع في الاسفل ref. below		--																		
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1														0.0	0.0	#DIV/0!			
	عرض المياه water width	يدوي manual	m		--														0	0	#DIV/0!			
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--														0.0	0.0	#DIV/0!			
	نسبة الجريان flow rate	يدوي manual	l/s		--														0.0	0.0	#DIV/0!			
	الرائحة odor	يدوي manual	-		--																			
Basic Water Analysis	pH	pH meter	-	السطح	0.1														0.0	0.0	#DIV/0!			
	درجة حرارة المياه .Water Temp	pH meter	℃	السطح	0.1														0.0	0.0	#DIV/0!			
	اللون Color	portable colorimeter	-	السطح	25														0	0	#DIV/0!			
	Total dissolved solids (TDS)	portable EC/TDS meter	mg/l	السطح	1														0	0	#DIV/0!			
	DO	portable DO meter	mg/l	السطح	0.05														0.00	0.00	#DIV/0!			
	Total suspended solids (SS)	portable colorimeter	mg/l	السطح	22.1														0.0	0.0	#DIV/0!			
	COD	colorimeter	mg/l	السطح	4(Low) 30(High)														0	0	#DIV/0!			
	BOD_5	culture	mg/l	السطح	1														0	0	#DIV/0!			
	NO_3^-	portable colorimeter	mg/l	السطح	0.2(Low) 0.8(High)														0.0	0.0	#DIV/0!			
	PO_4^{3-}	portable colorimeter	mg/l	السطح	0.05(Low) 0.14(High)														0.00	0.00	#DIV/0!			
	Cl^-	Digital Titrator	mg/l	السطح	10														0	0	#DIV/0!			
	NH_3-N	portable colorimeter	mg/l	السطح	0.08(Low) 1(High)														0.0	0.0	#DIV/0!			
	الناقلية الكهربائية Electrical Conductivity	portable EC/TDS meter	µS/cm	السطح	1														0	0	#DIV/0!			
	العكارة Turbidity	portable turbidity meter	NTU	السطح	0.01														0.0	0.0	#DIV/0!			
Chemical and Biological Analiysis 1	pH	Labo pH meter	-	السطح	0.1														0.0	0.0	#DIV/0!			
	COD_{Cr}	potassium dichromate	mg/l	السطح	1.0 (Low) 1 (High)														0.0	0.0	#DIV/0!			
	PO_4^{3-}	Spectral photometric	mg/l	السطح	0.02														0.00	0.00	#DIV/0!			
	Cl^-	Ion Select Electrobe	mg/l	السطح	3.55														0.0	0.0	#DIV/0!			
	NH_3-N	Spectral photometric	mg/l	السطح	0.02														0.00	0.00	#DIV/0!			
	NO_3^--N	Ion Select Electrobe	mg/l	السطح	0.6														0.0	0.0	#DIV/0!			
	الزيت & الشحم Oil & grease	Solvent extraction	mg/l	السطح	0.1														0.0	0.0	#DIV/0!			
	Total suspended solids (SS)	Filtrate weigh	mg/l	السطح															0.0	0.0	#DIV/0!			
	المعلقات المستقرة Settleable solids	Filtrate weigh	mg/l	السطح															0.0	0.0	#DIV/0!			
	Fluorides (F^-)	Ion Select Electrobe	mg/l	السطح	0.02														0.00	0.00	#DIV/0!			
	Sulfide (S^{2-})	Ion Select Electrobe	mg/l	السطح	0.005														0.00	0.00	#DIV/0!			
	خافض للتوتر السطحي Surfactants	Spectral photometric	mg/l	السطح	0.002														0.000	0.000	#DIV/0!			
	العدد الكلي لمجموعة المستعمرات Total count of the colony group	colony counter	MPN/100ml	السطح	1														0.0	0.0	#DIV/0!			
	Chromiumu,Hexavalent Cr(VI)	Spectral photometric	mg/l	السطح	0.01														0.00	0.00	#DIV/0!			
	Chromiumu, Total (T-Cr)	Spectral photometric	mg/l	السطح	0.01														0.00	0.00	#DIV/0!			
	Cyan (CN^-)	Ion Select Electrobe	mg/l	السطح	0.13														0.00	0.00	#DIV/0!			

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Guide: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: O, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الأساسي للمياه وتحاليل المياه البيولوجية والكيميائية 2 (ريف دمشق- حمص- حلب)

Recording Format for Chemical & Biological and Basic Water Analysis (Damascus countryside, HOMS, ALEPPO DFEAs)

Basic Information	الرمز Code	المحافظة Governorate			المدينة City			البلدة Town									القرية Village				
		نهر / بحيرة/ معمل River/Lake/Factory															وصف موقع الاعتيان: Sampling site description				
		السنة Year																			
		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.		
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:					
	المادة **Item**	**الطريقة** **Analysis Method**	**الوحدة** **Unit**	**العمق** **Depth**	**Quantitation Limits**																
	الطقس weather	يدوي manual	المرجع في الأسفل ref. below		--																
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1												0.0	0.0	#DIV/0!		
	عرض المياه water width	يدوي manual	m		--												0	0	#DIV/0!		
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--												0.0	0.0	#DIV/0!		
	نسبة الجريان flow rate	يدوي manual	l/s		--												0.0	0.0	#DIV/0!		
	الرائحة odor	يدوي manual	-		--																
Basic Water Analysis	pH	pH meter	-	السطح	0.1												0.0	0.0	#DIV/0!		
	درجة حرارة المياه .Water Temp	pH meter	℃	السطح	0.1												0.0	0.0	#DIV/0!		
	اللون Color	portable colorimeter	-	السطح	25												0	0	#DIV/0!		
	Total dissolved solids (TDS)	portable EC/TDS meter	mg/l	السطح	1												0	0	#DIV/0!		
	DO	portable DO meter	mg/l	السطح	0.05												0.00	0.00	#DIV/0!		
	Total suspended solids (SS)	portable colorimeter	mg/l	السطح	22.1												0.0	0.0	#DIV/0!		
	COD	colorimeter	mg/l	السطح	4(Low) 30(High)												0	0	#DIV/0!		
	BOD_5	culture	mg/l	السطح	1												0	0	#DIV/0!		
	NO_3^-	portable colorimeter	mg/l	السطح	0.2(Low) 0.8(High)												0.0	0.0	#DIV/0!		
	PO_4^{3-}	portable colorimeter	mg/l	السطح	0.05(Low) 0.14(High)												0.00	0.00	#DIV/0!		
	Cl^-	Digital Titrator	mg/l	السطح	10												0	0	#DIV/0!		
	NH_3-N	portable colorimeter	mg/l	السطح	0.08(Low) 1(High)												0.0	0.0	#DIV/0!		
	الناقلية الكهربائية Electrical Conductivity	portable EC/TDS meter	µS/cm	السطح	1												0	0	#DIV/0!		
	العكارة Turbidity	portable turbidity meter	NTU	السطح	0.01												0.0	0.0	#DIV/0!		
Chemical and Biological Analiysis 2	NH^3-N (Nitrogen, Ammonia)	Spectral photometric	mg/l	السطح	0.08												0.00	0.00	#DIV/0!		
	NO_2-N (Nitrogen, Nitrite)	Spectral photometric	mg/l	السطح	0.02												0.0	0.0	#DIV/0!		
	NO_3^--N (Nitrogen, Nitrate)	Spectral photometric	mg/l	السطح	0.2(Low) 0.8(High)												0.0	0.0	#DIV/0!		
	PO_4^{3-} (Phosphorus)	Spectral photometric	mg/l	السطح	0.05												0.00	0.00	#DIV/0!		
	Sulfide (S^{2-})	Spectral photometric	mg/l	السطح	0.01												0.00	0.00	#DIV/0!		
	الزيت & الشحم Oil & grease	Solvent extraction	mg/l	السطح	0.2												0.0	0.0	#DIV/0!		
	Surfactants Anionic	Spectral photometric	mg/l	السطح	0.03												0.000	0.000	4.000		
	Hardness, Mg （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1												0.00	0.00	#DIV/0!		
	Hardness, Ca （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1												0.00	0.00	#DIV/0!		
	Hardness, Total （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1												0.00	0.00	#DIV/0!		
	Chromiumu, Hexavalent Cr(VI)	Spectral photometric	mg/l	السطح	0.01												0.00	0.00	#DIV/0!		
	Chromiumu, Total (T-Cr)	Spectral photometric	mg/l	السطح	0.01												0.00	0.00	#DIV/0!		

Basic Information	الرمز Code	المحافظة Governorate			المدينة City		البلدة Town										القرية Village					
		نهر / بحيرة/ معمل River/Lake/Factory															وصف موقع الاعتيان: Sampling site description					
		السنة Year																				
		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:	:	:			
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**	**Quantitation Limits**																	
	الطقس weather	يدوي manual	المرجع في الأسفل ref. below		--																	
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1														0.0	0.0	#DIV/0!
	عرض المياه water width	يدوي manual	m		--														0	0	#DIV/0!
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--														0.0	0.0	#DIV/0!
	نسبة الجريان flow rate	يدوي manual	l/s		--														0.0	0.0	#DIV/0!
	الرائحة odor	يدوي manual	-		--																
Metal Analysis	Ag	Pretreat(HNO3)-AAS	mg/l		0.002														0.000	0.00	#DIV/0!
	Al	Pretreat(HNO3)-AAS	mg/l		0.005														0.000	0.00	#DIV/0!
	As	Hydride Vapor-AAS	mg/l		0.005														0.00	0.00	#DIV/0!
	Ba	Pretreat(HNO3)-AAS	mg/l		0.5														0.0	0.0	#DIV/0!
	Cd	Pretreat(HNO3)-AAS	mg/l		0.0001														0.0000	0.000	#DIV/0!
	Cr	Pretreat(HNO3)-AAS	mg/l		0.001														0.000	0.000	#DIV/0!
	Cu	Pretreat(HNO3)-AAS	mg/l		0.5														0.0	0.0	#DIV/0!
	Fe	Pretreat(HNO3)-AAS	mg/l		0.25														0.00	0.00	#DIV/0!
	Hg	Reduction Vapor-AAS	mg/l		0.0005														0.000	0.00	#DIV/0!
	Mn	Pretreat(HNO3)-AAS	mg/l		0.0005														0.000	0.00	#DIV/0!
	Ni	Pretreat(HNO3)-AAS	mg/l		0.002														0.000	0.00	#DIV/0!
	Pb	Pretreat(HNO3)-AAS	mg/l		0.005														0.000	0.00	#DIV/0!
	Sb	Pretreat(HNO3)-AAS	mg/l		0.005														0.000	0.00	#DIV/0!
	Zn	Pretreat(HNO3)-AAS	mg/l		0.1														0.0	0.0	#DIV/0!
																			0	0	#DIV/0!

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيرا إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Guide: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الأساسي للمياه وتحاليل المياه البيولوجية والكيميائية 2 (ريف دمشق- حمص- حلب)

Recording Format for Chemical & Biological and Basic Water Analysis (Damascus countryside, HOMS, ALEPPO DFEAs)

	الرمز Code	المحافظة Governorate			المدينة City						البلدة Town							القرية Village				
		نهر / بحيرة/ معمل River/Lake/Factory																وصف موقع الاعتيان: Sampling site description				
		السنة Year																				
		تاريخ الاعتيان اليوم / الشهر sampling date (day/month)			/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.		
		وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)			:	:	:	:	:	:	:	:	:	:	:	:	:					
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**	**Quantitation Limits**																	
Basic Information	الطقس weather	يدوي manual	المرجع في الأسفل ref. below		--																	
	درجة حرارة الهواء Air Temp.	يدوي manual	℃		0.1													0.0	0.0	#DIV/0!		
	عرض المياه water width	يدوي manual	m		--													0	0	#DIV/0!		
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m		--													0.0	0.0	#DIV/0!		
	نسبة الجريان flow rate	يدوي manual	l/s		--													0.0	0.0	#DIV/0!		
	الرائحة odor	يدوي manual	-		--																	
Basic Water Analysis	pH	pH meter	-	السطح	0.1													0.0	0.0	#DIV/0!		
	درجة حرارة المياه .Water Temp	pH meter	℃	السطح	0.1													0.0	0.0	#DIV/0!		
	اللون Color	portable colorimeter	-	السطح	25													0	0	#DIV/0!		
	Total dissolved solids (TDS)	portable EC/TDS meter	mg/l	السطح	1													0	0	#DIV/0!		
	DO	portable DO meter	mg/l	السطح	0.05													0.00	0.00	#DIV/0!		
	Total suspended solids (SS)	portable colorimeter	mg/l	السطح	22.1													0.0	0.0	#DIV/0!		
	COD	colorimeter	mg/l	السطح	4(Low) 30(High)													0	0	#DIV/0!		
	BOD_5	culture	mg/l	السطح	1													0	0	#DIV/0!		
	NO_3^-	portable colorimeter	mg/l	السطح	0.2(Low) 0.8(High)													0.0	0.0	#DIV/0!		
	PO_4^{3-}	portable colorimeter	mg/l	السطح	0.05(Low) 0.14(High)													0.00	0.00	#DIV/0!		
	Cl^-	Digital Titrator	mg/l	السطح	10													0	0	#DIV/0!		
	NH_3-N	portable colorimeter	mg/l	السطح	0.08(Low) 1(High)													0.0	0.0	#DIV/0!		
	الناقلية الكهربائية Electrical Conductivity	portable EC/TDS meter	µS/cm	السطح	1													0	0	#DIV/0!		
	العكارة Turbidity	portable turbidity meter	NTU	السطح	0.01													0.0	0.0	#DIV/0!		
Chemical and Biological Analiysis 2	NH^3-N (Nitrogen, Ammonia)	Spectral photometric	mg/l	السطح	0.08													0.00	0.00	#DIV/0!		
	NO_2-N (Nitrogen, Nitrite)	Spectral photometric	mg/l	السطح	0.02													0.0	0.0	#DIV/0!		
	NO_3^--N (Nitrogen, Nitrate)	Spectral photometric	mg/l	السطح	0.2(Low) 0.8(High)													0.0	0.0	#DIV/0!		
	PO_4^{3-} (Phosphorus)	Spectral photometric	mg/l	السطح	0.05													0.00	0.00	#DIV/0!		
	Sulfide (S^{2-})	Spectral photometric	mg/l	السطح	0.01													0.00	0.00	#DIV/0!		
	الزيت & الشحم Oil & grease	Solvent extraction	mg/l	السطح	0.2													0.0	0.0	#DIV/0!		
	Surfactants Anionic	Spectral photometric	mg/l	السطح	0.03													0.000	0.000	4.000		
	Hardness, Mg （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1													0.00	0.00	#DIV/0!		
	Hardness, Ca （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1													0.00	0.00	#DIV/0!		
	Hardness, Total （mg/l,$CaCO_3$）	Spectral photometric	mg/l	السطح	0.1													0.00	0.00	#DIV/0!		
	Chromiumu, Hexavalent Cr(VI)	Spectral photometric	mg/l	السطح	0.01													0.00	0.00	#DIV/0!		
	Chromiumu, Total (T-Cr)	Spectral photometric	mg/l	السطح	0.01													0.00	0.00	#DIV/0!		
																				0	0	#DIV/0!

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Guide: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل لتحليل المياه (المعادن) في المديريات الـ 14

Recording Format for Water Analysis for Metals (for all 14 DFEAs)

Basic Information	الرمز Code:		المحافظة Governorate		المدينة City				البلدة Town							القرية Village					
	نهر / بحيرة/ معمل River/Lake/Factory				وصف موقع الاعتيان: Sampling site description																
		2007	السنة Year																		
	تاريخ الاعتيان اليوم / الشهر sampling date (day/month)				/	/	/	/	/	/	/	/	/	/	/	/	/	الأدنى min.	الأقصى max.	المعدل السنوي av.
	وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)				:	:	:	:	:	:	:	:	:	:	:	:	:			
	المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**Quantitation**																	
	الطقس weather	يدوي manual	لمرجع في الأسفل ref. below																		
	درجة حرارة الهواء Air Temp.	يدوي manual	℃															0.0	0.0	#DIV/0!
	درجة حرارة المياه Water Temperature	يدوي manual	℃															0.0	0.0	#DIV/0!
	عرض المياه water width	يدوي manual	m															0	0	#DIV/0!
	عمق المياه في نقطة الاعتيان water depth	يدوي manual	m															0.0	0.0	#DIV/0!
	نسبة الجريان flow rate	يدوي manual	m/s															0.0	0.0	#DIV/0!
	الرائحة odor	يدوي manual	-																		
Metal Analysis	Ag	Pretreat(HNO3)-AAS	mg/l	0.002														0.000	0.00	#DIV/0!
	Al	Pretreat(HNO3)-AAS	mg/l	0.005														0.000	0.00	#DIV/0!
	As	Hydride Vapor-AAS	mg/l	0.005														0.00	0.00	#DIV/0!
	Ba	Pretreat(HNO3)-AAS	mg/l	0.5														0.0	0.0	#DIV/0!
	Cd	Pretreat(HNO3)-AAS	mg/l	0.0001														0.0000	0.000	#DIV/0!
	Cr	Pretreat(HNO3)-AAS	mg/l	0.001														0.000	0.000	#DIV/0!
	Cu	Pretreat(HNO3)-AAS	mg/l	0.5														0.0	0.0	#DIV/0!
	Fe	Pretreat(HNO3)-AAS	mg/l	0.25														0.00	0.00	#DIV/0!
	Hg	Reduction Vapor-AAS	mg/l	0.0005														0.000	0.00	#DIV/0!
	Mn	Pretreat(HNO3)-AAS	mg/l	0.0005														0.000	0.00	#DIV/0!
	Ni	Pretreat(HNO3)-AAS	mg/l	0.002														0.000	0.00	#DIV/0!
	Pb	Pretreat(HNO3)-AAS	mg/l	0.005														0.000	0.00	#DIV/0!
	Sb	Pretreat(HNO3)-AAS	mg/l	0.005														0.000	0.00	#DIV/0!
	Zn	Pretreat(HNO3)-AAS	mg/l	0.1														0.0	0.0	#DIV/0!

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Reference: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل لتحليل المياه (المعادن)

Recording Format for Water Analysis (Metals)

Basic Information	Date of Pretreatment تاريخ تطبيق المعالجة المسبقة Date of Measurement تاريخ اجراء التحليل								
	Name of Sample اسم العينة								
	\								
	Item المادة	**Analysis Method الطريقة**	**Unit الوحدة**	**Quantitation**					
	weather الطقس	manual يدوي	ref. below المرجع في الأسفل						
	Air Temp. درجة حرارة الهواء	manual يدوي	℃						
	Water Temperature درجة حرارة المياه	manual يدوي	℃						
	water width عرض المياه	manual يدوي	m						
	water depth عمق المياه في نقطة الاعتيان	manual يدوي	m						
	flow rate نسبة الجريان	manual يدوي	m/s						
	odor الرائحة	manual يدوي	-						
Metal Analysis	Ag	Pretreat(HNO3)-AAS	mg/l	0.002					
	Al	Pretreat(HNO3)-AAS	mg/l	0.005					
	As	Hydride Vapor-AAS	mg/l	0.005					
	Ba	Pretreat(HNO3)-AAS	mg/l	0.5					
	Cd	Pretreat(HNO3)-AAS	mg/l	0.0001					
	Cr	Pretreat(HNO3)-AAS	mg/l	0.001					
	Cu	Pretreat(HNO3)-AAS	mg/l	0.5					
	Fe	Pretreat(HNO3)-AAS	mg/l	0.25					
	Hg	Reduction Vapor-AAS	mg/l	0.0005					
	Mn	Pretreat(HNO3)-AAS	mg/l	0.0005					
	Ni	Pretreat(HNO3)-AAS	mg/l	0.002					
	Pb	Pretreat(HNO3)-AAS	mg/l	0.005					
	Sb	Pretreat(HNO3)-AAS	mg/l	0.005					
	Zn	Pretreat(HNO3)-AAS	mg/l	0.1					

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيرا إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Reference: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات

Name of Person in charge of Data Management

Basic Water Quality Results **نتائج التحاليل الأساسية للمياه**

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Information of dillution[#1] (*2, *5, *10, *20, *50, *100)	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم وتوقيع المحلل	high range / low range المجال مرتفع منخفض	Remarks ملاحظات
Field Measurement					**القياسات الميدانية**			
pH	pH units وحدات							
Air temp. حرارة الهواء	^{0}C							
Water temp. حرارة الماء	^{0}C							
EC	µS/cm							
TDS	mg/l							
DO	mg/l							
Laboratory Analysis							**التحليل المخبري**	
Color	Unit							
SS	mg/l							
COD_{Cr}	mg/l							
BOD_5	mg/l			Factor[#3] (2, 5, 10, 50, 100)				
NO_3^--N	mg/l						High range low range	
PO_4^{3-}	mg/l						High range low range	
Cl^-	mg/l							
NH_3-N	mg/l						High range low range	
Turbidity العكارة	NTU							

Name of Sampling station
اسم محطة الاعتيان: _____

Type of Waterbody:
نوع جسم الماء

Date of Analysis:
تاريخ التحليل _____
/ /

Signature of Laboratory Chief:
توقيع رئيس المخبر _____

Note) #1: Put a number of dillution ratio أذكر عدد مرات التمديد
#2 Circle the correct reagent range you chose ضع دائرة حول مجال الكاشف المستخدم.
#3: Circle a number of factor you chose. ضع دائرة حول العامل المختار

Chemical & Biological Water Quality Results 1(Damascus)

نتائج نوعية المياه الكيميائية والبيولوجية (دمشق)

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Information of dillution[#1] (*2, *5, *10, *20, *50, *100)	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم وتوقيع المحلل	Pretreatment
Field Measurement					**القياسات الميدانية**		
Air temp. حرارة الهواء	^0C						
Water temp. حرارة الماء	^0C						
Laboratory Analysis						**التحليل المخبري**	
pH	pH units وحدات						
COD_{Cr}	mg/l						
PO_4^{3-}	mg/l						
Cl^-	mg/l						
NH_3-N	mg/l						
NO_3^--N	mg/l						
Oil & grease	mg/l						
Total suspended solids (SS)	mg/l						
المعلقات المستقرة Settleable solids	mg/l						
Fluorides (F^-)	mg/l						
Sulfide (S^{2-})	mg/l						
خافض للتوتر السطحي Surfactants	mg/l						
العدد الكلي لمجموعة المستعمرات Total count of the colony group	MPN/100ml						
Chromiumu, Hexavalent Cr(VI)	mg/l						
Chromiumu, Total (T-Cr)	mg/l						
Cyan (CN^-)	mg/l						

Name of Sampling station
اسم محطة الاعتيان: _____

Type of Waterbody:
نوع جسم الماء

Date of Analysis:
تاريخ التحليل _____
/ /

Signature of Laboratory Chief:
توقيع رئيس المخبر _____

_____

Note) #1: Put a number of dillution ratio أذكر عدد مرات التمديد

Note and Remarks ملاحظات

Chemical & Biological Water Quality Results 2 (Damascus Countryside, Homs, Aleppo)

نتائج نوعية المياه الكيميائية والبيولوجية (ريف دمشق، حمص، حلب)

Parameter المعيار	Unit الوحدة	Sample (No.1) Result نتيجة العينة رقم 1	Replicate Sample (No.2) Result نتيجة العينة المكررة رقم 2	Information of dillution[#1] (*2, *5, *10, *20, *50, *100)	Final Result of the Sample النتيجة النهائية للعينة	Name and Signature:of Analyst اسم وتوقيع المحلل	Pretreatment	Remarks ملاحظات
Field Measurement							**القياسات الميدانية**	
Air temp. حرارة الهواء	^{0}C							
Water temp. حرارة الماء	^{0}C							
Laboratory Analysis							**التحليل المخبري**	
NH^3-N	mg/l							
NO_2-N	mg/l							
NO_3^--N	mg/l							
PO_4^{3-}	mg/l							
Sulfide (S^{2-})	mg/l							
Oil & grease	mg/l							
Surfactants Anionic	mg/l							
Hardness, Mg （mg/l,$CaCO_3$）	mg/l							
Hardness, Ca （mg/l,$CaCO_3$）	mg/l							
Hardness, Total （mg/l,$CaCO_3$）	mg/l							
Chromiumu, Hexavalent Cr(VI)	mg/l							
Chromiumu, Total (T-Cr)	mg/l							

Name of Sampling station
اسم محطة الاعتيان: _____

Type of Waterbody:
نوع جسم الماء

Date of Analysis:
تاريخ التحليل _____
/ /

Signature of Laboratory Chief:
توقيع رئيس المخبر _____

Note) #1: Put a number of dillution ratio أذكر عدد مرات التمديد

Monthly Report of Metal Analysis **التقرير الشهري لتحاليل المعادن**

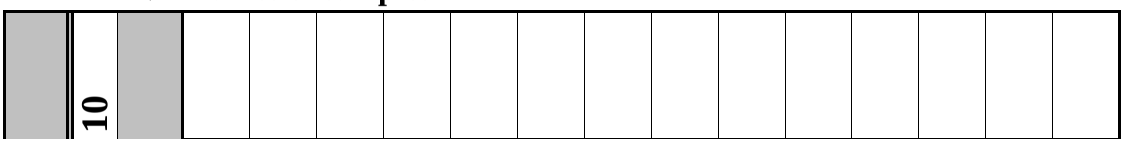
mm - yyyy	-	Administration No.				Name of DFEA (or Client)									
item	QL	Unit	01		02		03		04		05		06		07		08		09	
Ag	0.002	mg/l																		
Al	0.005	mg/l																		
As	0.005	mg/l																		
Ba	0.5	mg/l																		
Cd	0.0001	mg/l																		
Cr	0.001	mg/l																		
Cu	0.5	mg/l																		
Fe	0.25	mg/l																		
Hg	0.0005	mg/l																		
Mn	0.0005	mg/l																		
Ni	0.002	mg/l																		
Pb	0.005	mg/l																		
Sb	0.005	mg/l																		
Zn	0.1	mg/l																		

↑

put [O] for required analysis ضع إشارة O لتحاليل المطلوبة Name of Person in charge of Data Management

To be filled by client تملأ من قبل العميل

↓ **Names of samples**



شكل السجل للتحليل الأساسي للمياه

Recording Format for Basic Water Analysis (for all 14 DFEAs)

الرمز Code	المحافظة Governorate	المدينة City	البلدة Town	القرية Village
	نهر/ بحيرة/ معمل River/Lake/Factory	وصف موقع الاعتيان: Sampling site description		
	السنة Year			

تاريخ الاعتيان اليوم / الشهر sampling date (day/month)		/	/	/	/	/	/	/	/	/	/	/	/	/	الأقصى min.	الأقل max.	المعدل السنوي av.
وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)		:	:	:	:	:	:	:	:	:	:	:	:	:			
المادة **Item**	**الطريقة** **Analysis Method**	**الوحدة** **Unit**	**العمق** **Depth**															
الطقس weather	يدوي manual	المرجع في الأسفل ref. below																
درجة حرارة الهواء Air Temp.	يدوي manual	℃																
عرض المياه water width	يدوي manual	m																
عمق المياه في نقطة الاعتيان water depth	يدوي manual	m													0.0	0.0	#DIV/0!	
نسبة الجريان flow rate	يدوي manual	l/s													0.0	0.0	#DIV/0!	
الرائحة odor	يدوي manual	-																
pH	pH meter	-	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
درجة حرارة المياه Water Temp.	pH meter	℃	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
اللون Color	portable colorimeter	-	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
Total dissolved solids (TDS)	portable EC/TDS meter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
DO	portable DO meter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
Total suspended solids (SS)	portable colorimeter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
COD	colorimeter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
BOD_5	culture	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
NO_3^-	portable colorimeter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
PO_4^{3-}	portable colorimeter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
Cl^-	Digital Titrator	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
NH_3-N	portable colorimeter	mg/l	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
الناقلية الكهربائية Electrical Conductivity	portable EC/TDS meter	µS/cm	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
العكارة Turbidity	portable turbidity meter	NTU	السطح												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	
			m												0.0	0.0	#DIV/0!	

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Reference: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: O, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الكيمياني والبيولوجي للمياه (لمديرية دمشق فقط)

Recording Format for Chemical & Biological Water Analysis (only for Damascus DFEA)

الرمز Code	المحافظة Governorate	المدينة City	البلدة Town	القرية Village
	نهر / بحيرة/ معمل River/Lake/Factory			وصف موقع الاعتيان: Sampling site description
	السنة Year			

	تاريخ الاعتيان اليوم / الشهر sampling date (day/month)		/	/	/	/	/	/	/	/	/	/	/	/	/	الأقصى min.	الأقل max.	المعدل السنوي av.
	وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)		:	:	:	:	:	:	:	:	:	:	:	:	:			
المادة Item	**الطريقة Analysis Method**	**الوحدة Unit**	**العمق Depth**															
الطقس weather	يدوي manual	المرجع في الاسفل ref. below																
درجة حرارة الهواء Air Temp.	يدوي manual	℃																
عرض المياه water width	يدوي manual	m																
عمق المياه في نقطة الاعتيان water depth	يدوي manual	m														0.0	0.0	#DIV/0!
نسبة الجريان flow rate	يدوي manual	l/s														0.0	0.0	#DIV/0!
الرائحة odor	يدوي manual	-																
pH	Labo pH meter	-	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
درجة حرارة المياه Water Temp.	portable colorimeter	℃	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
Color اللون	portable colorimeter	-	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
إجمالي المعلقات المنحلة Total dissolved solids (TDS)	Labo EC meter	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
العوالق Total suspended solids (SS)	Filtrate weigh	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
COD_{Cr}	potassium dichromate	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
NO_3^-	Ion Select Electrobe	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
PO_4^{3-}	Spectral photometric	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
Cl^-	Ion Select Electrobe	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
NH_3-N	Spectral photometric	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
الزيت & الشحم Oil & grease	Solvent Hexane extract	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
المعلقات المستقرة Settleable solids	Filtrate weigh	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
الفلوريد Fluorides	Ion Select Electrobe	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
الكبريتيد Sulfide-S	Ion Select Electrobe	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
خافض للتوتر السطحي Surfactants	Spectral photometric	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
العدد الكلي لمجموعة المستعمرات Total count of the colony group	colony counter	-	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
السيانيد Cyan (CN)	Ion Select Electrobe	mg/l	السطح													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!
			m													0.0	0.0	#DIV/0!

المرجع: صف حالة الجو خلال فترة الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس:◎ ، غائم: ○، ماطر (خفيف): △، ماطر (بشدة): ▲

Guide: Describe the weather on sampling time at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management

شكل السجل للتحليل الأساسي للهواء (لمديريات دمشق، حلب، حمص)

Recording Format for Basic Air Analysis (for Damascus, Homs, and Aleppo DFEA)

الرمز Code	المحافظة Governorate	المدينة City	البلدة Town	القرية Village																
	السنة Year	وصف موقع الاعتيان: Sampling site description																		
	تاريخ الاعتيان اليوم / الشهر sampling date (day/month)	/	/	/	/	/	/	/	/	/	/	/	/	/	/	المعدل av.	الأقصى max.	الأقل min.
بدء الاعتيان Start of sampling	وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)	:	:	:	:	:	:	:	:	:	:	:	:	:	:			
نهاية الاعتيان End of sampling	تاريخ الاعتيان اليوم / الشهر sampling date (day/month)	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	وقت الاعتيان: (ساعة/ دقائق) sampling time(hh:mm)	:	:	:	:	:	:	:	:	:	:	:	:	:	:			
مدة الاعتيان (ساعة) Sampling duration (hours)																#DIV/0!	0.0	0.0
المادة Item	**طريقة المراقبة / التحليل Monitoring/Analysis**	**الوحدة Unit**																
الطقس weather	يدوي manual	المرجع في الأسفل ref. below																
اتجاه الريح wind direction	مقياس اتجاه الريح wind direction meter	د رجة degree														#DIV/0!	0	0
سرعة الريح wind speed	مقياس سرعة الريح wind speed meter	m/s														#DIV/0!	0.0	0.0
SO2	أداة اعتيان / يدوية handy sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
SO2	أداة اعتيان بسيطة / يدوية simple sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
SOx	أداة اعتيان / يدوية handy sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
SOx	أداة اعتيان بسيطة / يدوية simple sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
NO2	أداة اعتيان / يدوية handy sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
NO2	أداة اعتيان بسيطة / يدوية simple sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
NOx	أداة اعتيان / يدوية handy sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
NOx	أداة اعتيان بسيطة / يدوية simple sampler/ manual	$\mu g/m^3$														#DIV/0!	0.0	0.0
Pb	آخذ عينات عالي الحجم HV sampler	$\mu g/m^3$														#DIV/0!	0.0	0.0
TSP	آخذ عينات عالي الحجم HV sampler	$\mu g/m^3$														#DIV/0!	0.0	0.0
PM10	آخذ عينات منخفض الحجم LV sampler	$\mu g/m^3$														#DIV/0!	0.0	0.0

المرجع: صف حالة الجو خلال الاعتيان وعند نقطة الاعتيان مشيراً إلى التالي:
صحو/مشمس، غائم، ماطر (خفيف)، ماطر (بشدة)
إذا كان الاعتيان لأكثر من يوم، صف الوضع قدر استطاعتك
مثال: المطر الشديد الذي يلحقه شمس يمكن وصفه على الشكل التالي

Guide: Describe the weather about sampling period at a sampling point refering to the following marks;
clear/sunny: ◎, overcast: ○, rain (gentle): △, rain (heavy): ▲
if sampling period is more than one day, describe to the extent you can do.
ex) heavy rain followed by sunny can be described as▲/◎

اسم الشخص المسؤول عن إدارة البيانات
Name of Person in charge of Data Management