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Compatibility Assessment of the Quality Management System in the College of Engineering Laboratories of the University of Kerbala with ISO 17025:2005 requirements

تقييم توافق نظام ادارة الجوده في مختبرات كلية الهندسة في جامعة كربلاء مع متطلبات الايزو 17025 لسنة 2005

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Abstract

This research aims at assessing the compatibility of the Quality Management System in the laboratories of the College of Engineering at the University of Karbala with the International Standards for laboratories competence of testing and calibration ISO 17025 : 2005, and highlighting the importance of the main requirements that should be fulfilled for accreditation which proves the completion of tasks proper .. The results of the field survey showed weakness points in the systems and procedures in these laboratories because of the lack of some of the international standards requirements. In light of what has been reached, based on ISO 17025,recommendations have been set for the development of Quality Management System, and administrative and technical operations in the laboratories of the College of Engineering.

الخلاصة :

يهدف هذا البحث إلى تقييم توافق نظام ادارة الجوده في مختبرات كلية الهندسة في جامعة كربلاء مع المواصفة الدولية الخاصة بأهلية مختبرات الفحص والمعايرة (الايزو 17025 لسنة 2005) ، وإبراز أهمية المتطلبات العامة التي ينبغي على المختبرات الايفاء بها للحصول على الاعتماد الذي يثبت انجاز مهامها بالشكل الصحيح. وقد أظهرت نتائج المسح الميداني نقاط الضعف في النظم والإجراءات المعمول بها في هذه المختبرات بسبب افتقارها لبعض من متطلبات المواصفة الدولية. وفي ضوء ما تم التوصل إليه واستنادًا إلى مواصفة الايزو 17025 تم ابداء التوصيات لتطوير نظام ادارة الجودة والعمليات الادارية والتقنية في مختبرات كلية الهندسة .

1.Introduction:

Increased global attention paid to quality due to increased competition between companies and institutions of different activities areas, all over the world necessitates to adopt modern quality systems according to international standards [1].

Public institutions production and services in Iraq are recently driven towards the adoption of total quality management systems in accordance with the international standards of (ISO 9000).In order to be applicable in the field of laboratories the International standards Organization issued ISO 17025 [2]. The application of ISO 17025 is a major step to ensure the competence of testing and calibrating laboratories and to raise efficiency performance to a high degree of reliability (locally, regionally and globally) [3].

2.Research objectives

The search aim at diagnosing the factors and causes that obstacles the application of the quality requirements of ISO 17025, and identifying weakness points in current procedures in addition to set effective recommendations to satisfy standards .

3. Research Justification

That any impairment or incompleteness in the level of construction laboratory performance quality in what they offer to the customer will reflect negatively on the achievement of the establish objectives, where is the application of quality system in construction laboratory, the main step to ensure the competence of testing and calibration and raise laboratories efficiency to reach the degree of reliability accepted locally and internationally to ensure adequate opportunities for local and international competition.

4. Research Methodology

The research work, undertaken to achieve the research objectives, has adopted the following methodology:

(A) Assessing the compatibility of the administrative requirements specified in ISO 17025 with actual administrative processes using compatibility assessment forms which includes the administrative requirements of the specification to be achieved in processes as listed in tables(1-14).

(B) Assessing the compatibility of technical processes with the technical requirements of ISO 17025 using another assessment forms which includes the technical requirements of the specification as listed in tables (15-23). the aim of both steps is to determine the gap between the reality of operations and the requirements of the specification.

5. Quality Management System :

A quality management system is a systematic way to ensure that all activities are implemented as planned [4]. The quality management system consists of three parts: strategic planning, publication of strategy and information system to monitor, analyze and improve its publication [5].. Any laboratory quality management system must include all the policies and procedures required by the standards, and should contain all quality related documents and procedures [6]. The quality model shown in Fig. 1 illustrates all laboratory activities in (12) basic groups [7].

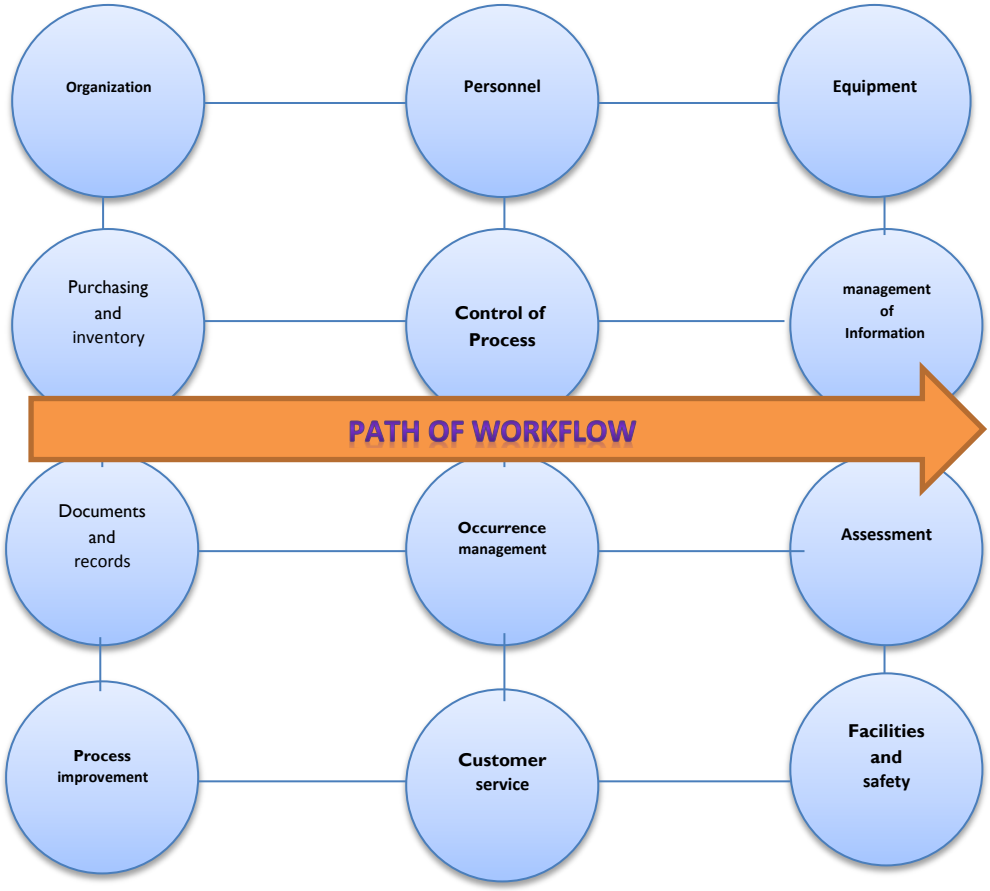

Figure 1 A Typical Quality Management System Model [7]

Fig 2 illustrates the basic requirements of ISO 17025 for testing laboratories that will be investigated in this research. ISO 17025 consist of administrative and technical requirements. Administrative requirements are related to the process and the effectiveness of the laboratory quality management system. Technical requirements deal with the competence of staff, testing methodology, equipment and quality, and the reports of tests and calibration [3].

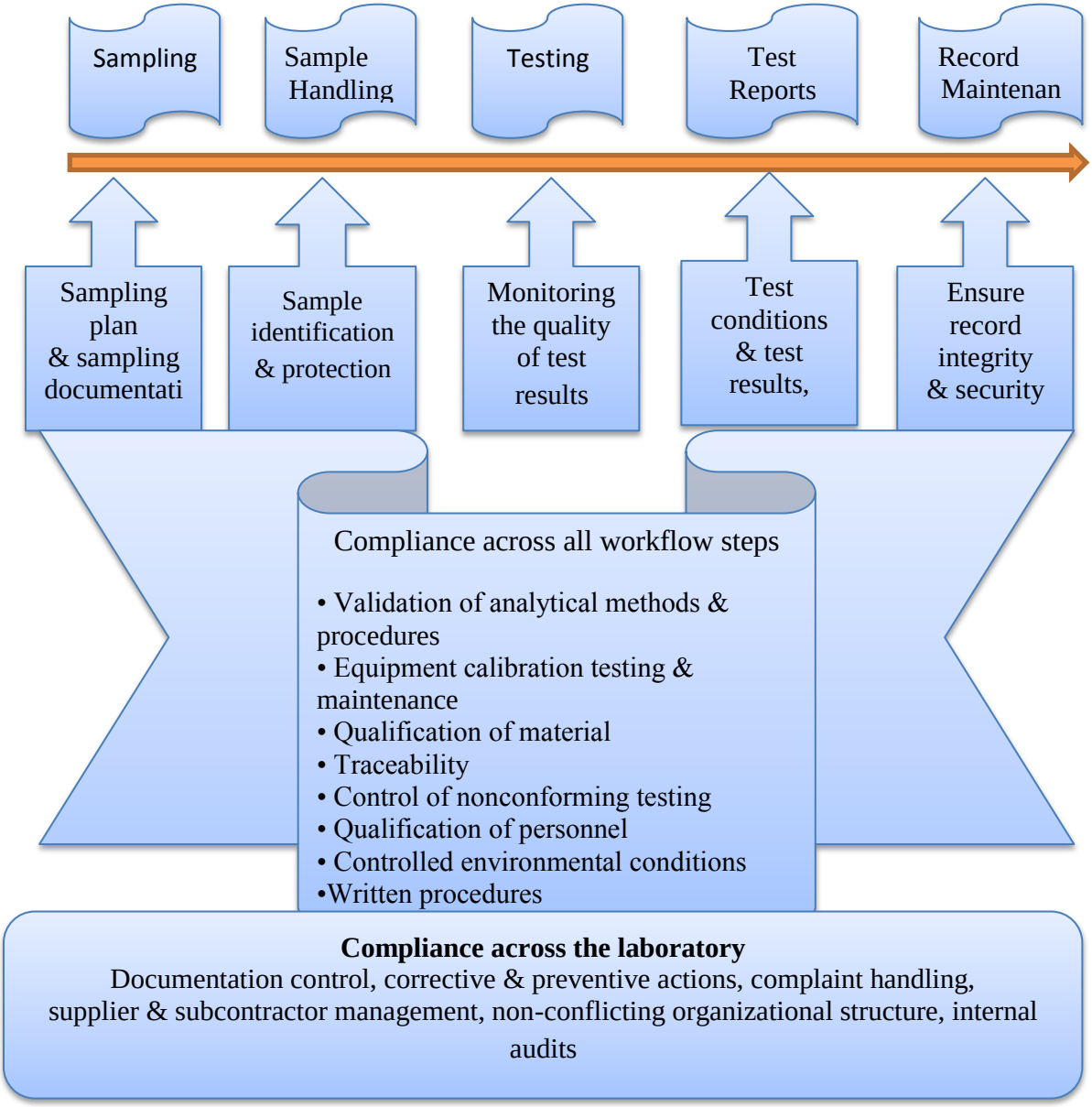

Figure 2 : ISO 17025 Requirements for Testing Laboratories [3]

6. Quality System Essentials

Laboratory work is consists of technical activities that produce laboratory results and management activities that support the technical work as listed below [8].

- Documents and Records
- Organization
- Personnel
- Equipment
- Purchasing and Inventory
- Process Control

- Information Management
- Occurrence Management
- Assessment: External and Internal
- Process Improvement
- Customer Service and Satisfaction
- Facilities and Safety

The implementation of ISO 17025 as a part of laboratory quality management improvement will assist both both laboratory and business in improving competence as shown in Figure 3 [3]&[9].

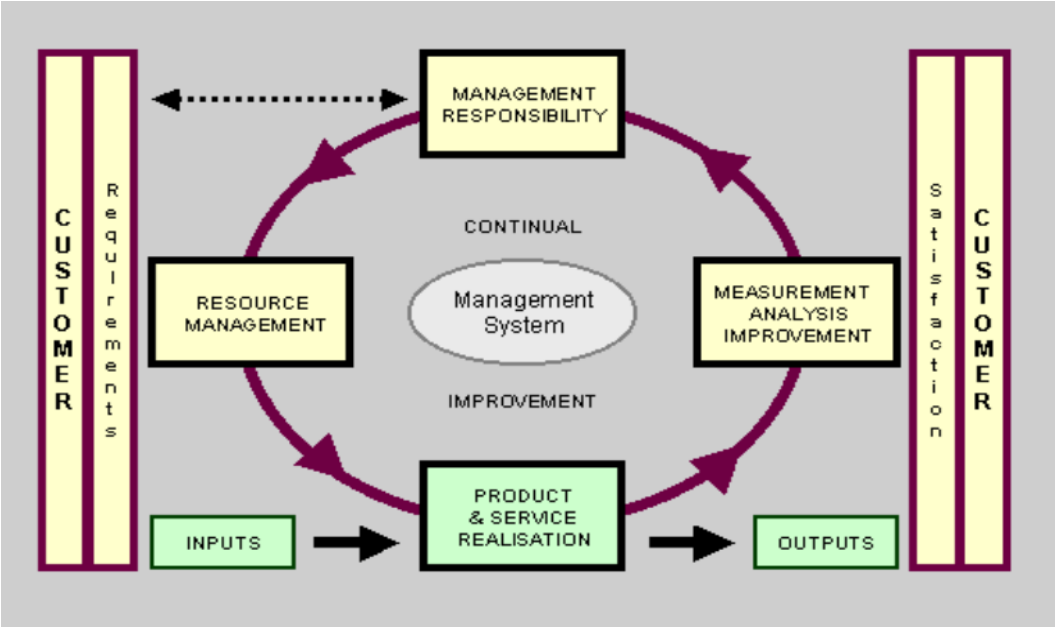

Figure 3 Preview The Plan–Do–Check–Act (PDCA) Cycle .

7. The Quality Management importance :

Improve quality, increase productivity, reduce cost and increase profitability as integrated targets.

- Enable the administration to study the needs of customers and meet those needs.
- Contribute to achieve a competitive advantage in the local and international markets.
- Contribute to better decision-making and problem-solving.
- Strengthen the coherence and coordination of the whole facility departments.
- Help to overcome the obstacles that hinder the performance of the employee to deliver a high quality product [10].

8. ISO 17025 compatibility assessment of the Research Sample

The context of work in the construction laboratories of the college of Engineering were assessed through forms which includes the administrative requirements and another forms includes technical requirements.

8.1 Compatibility assessment with the administrative requirements

Table (1) Compatibility assessment form of basic arrangement and management requirements .

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory have entity shall bear legal responsibility.	*		
2	Define the responsibilities of main people in the organization who have an impact on the laboratory activities if the laboratory part of the organization perform other activities of testing and / or calibration and so as to avoid conflict in responsibilities.	*		
3	The laboratory have affiliated with administrators and technicians are qualified, and they have the powers and resources required to carry out their duties in the tests.	*		
4	The Laboratory have arrangements to ensure that his administration and its affiliates are not subject to any pressure and the effects may adversely affect the quality of their work.	*		
5	The Laboratory have policies and procedures to ensure that the confidentiality of the information and ownership rights to the results of the tests.	*		
6	The Laboratory have policies and procedures to avoid any activities may weaken confidence in the efficiency or integrity of the decisions of his work.	*		
7	Determine the organizational and administrative structure and its relationship with quality administration, technical operations.	*		
8	Determine the responsibility and the authority and Interior links to all persons who manage and perform or checking of works.	*		
9	Provide supervision on the test staff by a group of people have knowledge of the methods and procedures.	*		
10	The laboratory have technical administration bore the full responsibility for technical operations and to take special measures of necessary resources to ensure the required quality of laboratory operations.	*		

• Strength points :

1. The laboratory or the organization that owns the laboratory is part of which entity shall bear legal responsibility.
2. Define the responsibilities of main people in the organization who have an impact on the activities of the laboratory.
3. The trained and qualified individuals use to perform their duties relating to the completion of laboratory tests.
4. The laboratory administrators and its affiliates are not subject to any pressure.
5. Provide policies and procedures to maintain the confidentiality of the tests results.
6. Determine the job description for all peoples who manage and perform or checking of business affecting the quality tests.
7. Provide appropriate supervision to the test staff by people have knowledge with the methods and procedures and the objectives of each test with an assessment of the test results.
8. Existence a technical administration bore the full responsibility for technical operations and to take special measures to ensure the required resources quality of laboratory operations.
9. Provide policies and procedures implemented to avoid activities that undermine confidence in the efficiency or integrity of the decisions of the laboratory work.

10. Provide the arrangement structure of the organization and location of the laboratory of the parent organization.

Table (2) Compatibility assessment form of the conformity assessment document control requirements .

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Prepare and maintain procedures to control documents, including the validation and issuance of documents in terms of their distribution in the administration system and be readily available to prevent the use of obsolete and / or neglected documents.	*		
2	It is reviewed and endorsed all the documents that are issued in the laboratory by authorized people before they are issued.	*		
3	Determine the necessary procedures in the review process and authentication when modified or changed documents.			*
4	Preparing measures to describe how to conduct and control of changes in documents saved in the computer systems.			*

• Strength points :

1. Availability of procedures to adjust the documents.
2. The existence of the review and approval of all documents before they are issued.

• Weakness points :

1. The necessary procedures and powers in the review process and authentication when modified or changed documents, especially if you modify the documents manually until version, verified partially.
2. Measures to describe how to conduct and control of changes in documents saved in the computer systems, are not available.

Table No. (3) Compatibility assessment form of the conformity assessment requirements of the review of orders and tenders and contracts .

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory prepare and maintain procedures for review of orders and tenders and contracts.			*
2	Perpetuating records included any significant changes in addition to maintaining discussions records with the customer regarding its requirements or the results of work during the period of execution of the contract.		*	

• Weakness points

1. Review of orders and tenders and contracts procedures, which lead to the signing a contract for test, verified partially.
2. No available of discussions records with the customer that relating its requirements and the results of the work.

Table No. (4) Compatibility assessment form of the of the conformity assessment requirements of the contract for secondary inspections, testing and / or calibration .

No.	Requirements	Compatible	Not Compatible	Compatible partially
1	The existence of special policy for the secondary contract with records containing the names of all subcontractors who are used to carry out tests and / or calibrations.	*		

• Strength points:

1. The existence of special policy for secondary contracted with ensure the conservation and maintenance of records containing the names of all subcontractors.

Table (5) Compatibility assessment form of the conformity assessment requirements of the procurement of services and equipment

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Laboratory have a policy and procedures for the selection and purchase, receipt, storage services and equipment, chemicals, reagents and expendable laboratory materials.	*		
2	The laboratory guarantees the non-use of equipment and reagents of expendable materials that are purchased only after being tested and verified compliance with the standard specifications.		*	
3	The procurement documents are reviewed and approval of the technical content before allowing their use.	*		
4	There is an assessment of the suppliers of materials and services that affect the quality of testing and calibration			*

• Strength points :

1. The lab. has procedures for the selection and purchase, receipt, storage services and equipment, chemicals, reagents and expendable laboratory materials.
2. The procurement documents are reviewed and approval before allowing their use.

• Weakness points :

1. Lab. does not guarantee the non-use of equipment and reagents and consumable materials that are purchased.
2. assessment of suppliers of materials and services, verified partially .

Table (6) Compatibility assessment form of the customer service requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Laboratory cooperate with customers in respect of work to be implemented.	*		
2	The laboratory allows to the customer or his representative to enter certain places from the laboratory to see the implementation of tests and / or calibrations.			*
3	The laboratory preparing and packaging and sending inspection and testing and / or calibration materials needed by the customer for verification purposes.		*	
4	The lab. conducts of contacts with the customer on length of the work, and tells customer for any delays or major deviations in the performance of tests and / or calibrations.			*
5	The lab ask feedback positive and negative information from his clients and use and analyze this information to improve the management system.		*	

• Strength points

1- The laboratory cooperation with customers in respect of work needs to be implemented with the assurance of confidentiality to other customers.

• Weakness points

1-The laboratory allow to the customer or his representative to entry to certain places from the laboratory, verifier partially.
2- The laboratory does not prepare and sending the testing and / or calibration items for verification purposes.
3- Secure and maintain of contact with the customer by the laboratory along work, verifier partially.
4- The laboratory does not hold the feedback positive and negative of his customers.

Table No. (7) compatibility assessment form of the complaints

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Records are kept of all complaints, investigations and corrective actions taken by the laboratory.			*
2	The laboratory have a policy to resolve the complaints received from customers or other actors.	*		

• Strength point

1- Available in the laboratory a policy to resolve complaints.

•Weakness points

1- Records keep of complaints and investigations and corrective actions taken by the laboratory, verifier partially.

Table (8) compatibility assessment form of the adjusts examination and testing and / or calibration process non-conforming.

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory have procedures and policy outlining the responsibilities in administration of non-conforming work and take corrective action immediately .	*		

•Strength points

1- Possession of the lab. policy and procedures sets out the responsibilities in administration of non-conforming work.

Table (9) compatibility assessment form for improvement

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Improve the laboratory administrative system efficiency through use of quality policy, quality objectives, audit results, data analysis, corrective and preventive actions and management review.			*

•Weakness points

1-The laboratory use of quality policy, quality objectives, audit results, data analysis, corrective and preventive actions and management review, verifier partially.

Table (10) Compatibility assessment form of the corrective procedures

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory prepare policy to implement corrective action when determining the status of non-conformity or deviation from the policies or procedures installed in the management system or technical operations.	*		

•Strength points

1-Implement of the lab. corrective action when determining the status of non-conformity in the management system or technical operations.

Table (11) Compatibility assessment form of the preventive procedures

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Adjust procedures concerning of preventive actions to ensure the effective impact and documented in accordance with the documentation of the quality management system requirements.		*	

•Weakness points

1-There is no set of preventive actions to ensure quality management system**.**

Table (12)) Compatibility assessment form of the records set requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Establish and maintain procedures for identifying ,cataloging, entry, archive and storage, maintain, destroy of quality and technical records .	*		
2	All records are clear and stored and easily retrievable manner reservation and in a suitable environment to prevent damage or loss of identification with determine the time periods for safekeeping.	*		
3	All records are kept to ensure confidentiality and integrity.	*		
4	The lab. has procedures to protect and support the records and prevent unauthorized entry to or modify them.		*	

• Strength points

1-Provide procedure to identify, collect, index , archive , entry , storage, maintain and destroy of quality and technical records.

2-Clear records are kept and stored easily retrievable manner and in a suitable.

3-Ensure the confidentiality and integrity of the records.

• Weakness points

1-Not available procedures to protect and support the records kept electronically.

Table (13) Compatibility assessment form for internal audits requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Provide a pre-scheduling specific for internal audits of the laboratory activities to verify that the operations are matching to the requirement.			*
2	Implementation of internal audit by qualified and trained individuals, who are independent of the activity that is being audited and a timetable has planned and organized by the quality manager once a year at least.			*
3	The laboratory take corrective action immediately when existence audit indicates of doubt on the validity of the examination, testing and / or calibration results and the customer is notified in writing if the investigations proved that the results given to him have been affected by this.	*		
4	Provide methods of the audit follow-up and implementation of events and documented with determining the period of time to keep them.		*	

- **Strength points**

1- The laboratory take corrective action when there is doubt about the test results.

- **Weakness points**

1- Compatible partially of a scheduling of internal previews of the laboratory activities.
2- Non-implementation of the internal audit by the independent members of the activity that is being audited because lack of available resources.
3-The lack of follow-up audit activities and implementation, documentation specifying the time period for retention.

Table No. (14) compatibility assessment form for the management reviews requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory senior administration review the management system and inspection, testing and / or calibration activities and periodically according to a specific schedule in advance to ensure the continued relevance and effectiveness and to introduce necessary changes or improvements.	*		
2	The review of management includes plans for the coming year and be audited once in year at least.	*		
3	Record the results of management reviews and actions resulting from it and ensure the implementation of these management measures through an appropriate and agreed-upon timetable.	*		

• Strength points

1-Review the laboratory senior management of the management system to ensure continuity of specific relevance and effectiveness.
2- Record the results of management reviews and actions resulting from it and ensure the implementation of these management measures through an appropriate and agreed-upon timetable.
3-Review management to objectives and business plans for the coming year, verifier partially.

8-2 .Compatibility Assessment with the Technical Requirements:

Table No. (15)) compatibility assessment form of the examiners requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The Laboratory management ensures that the merits of each person operating of certain equipment and lead tests and / or calibrations and evaluates the results and sign the test reports and calibration certificates	*		
2	The laboratory have a policy and procedures to identify training needs and provide training to its adherents, and that the training program is of relevance to the expected present tasks of the laboratory.		*	
3	the laboratory ensure that the employees of associate or additional technicians are work according to the management system of the laboratory.	*		
4	Laboratory retains of administrators and technicians job description who have a relationship of tests and / or calibrations.	*		

• Strength points

1-Ensure the laboratory management that the merits of equipment operators and lead tests and evaluates the results.

2-Possession of laboratory technicians are work in accordance with the management system of the laboratory.

3-Provide a administrators and technicians job description.

• Weakness points

1-Lack of adherents training plans in the light of the skills required for each job related to the quality of the training need tests .

Table No. (16)) compatibility assessment form of the environmental conditions and the workplace requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory monitoring, control and record environmental conditions as required in the specifications .		*	
2	There is an effective isolation between neighboring regions with disparate activities and taken procedures to prevent cross-contamination between them and environmental pollution and protect the environment from waste testing.			*
3	Determine entry to laboratory areas that affect on the tests quality and / or calibrations depending on specific circumstances.		*	
4	Provides procedures and industrial safety equipment for workers.			*

• Weakness points

1- The lack of monitoring and control and record of environmental conditions .

2- The lack of procedures to ensure the protection of the environment from pollution.

3- The lack of control on the entry and use of areas that affect the tests quality.

4- partially available of industrial safety equipment for workers.

Table No. (17) compatibility assessment form for the requirements of the testing and inspection, calibration and suitability ways .

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory use of last modern versions of standard specification in the ways of testing and inspection and / or calibration .			*
2	The laboratory choice of the appropriate methods for test when the customer does not specify the test method.	*		
3	An estimate of the uncertain measurement in addition to the statistical techniques for analysis of testing and / or calibration data.			*
4	The laboratory retains all the instructions, standards, manuals and reference data related to the laboratory work .			*
5	Introducing methods of test and calibration developed by the laboratory.			*
6	Provides sustain procedures of the software validity and appropriateness used in the testing.	*		
7	Perpetuate the computers to ensure proper engage and provide necessary environmental and operational conditions to ensure the safety of testing and calibration data.	*		

• Strength points

1- Selection of the appropriate methods for laboratory test.
2- Provide sustain procedures of the software used in the testing.
3- Sustain the computers and provide necessary environmental and operational conditions .

• Weakness points

1- Partial use of the last modern versions of the standard specification.
2- No one is estimated to uncertain measurement in addition to the statistical techniques for the analysis of and testing and / or calibration data.
3- The laboratory does not maintain all the instructions and standards, manuals and reference data relevant laboratory work up to date.
4- Introducing methods of test and calibration developed by the laboratory, partially achieved.

Table No. (18) compatibility assessment form for the equipment requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Laboratory supply all sampling and measurement requirements and testing necessary for the proper performance of the tests and / or calibrations			*
2	Ability the equipment to achieve the required accuracy and match the characteristics of the tests and / or calibrations concerned.	*		
3	The equipment tested or calibrated prior to their admission to the service to make sure it meets the requirements of the specification laboratory.	*		
4	The equipment operated by unaffiliated authorized with provide modern instructions for use and maintenance of the equipment and be accessible to employees of the laboratory.			*
5	Defined clearly and individually each unit of the equipment used for testing and calibration.			*
6	The laboratory have procedures for the proper circulation, transport, storage, use and planned maintenance of measuring instruments to ensure that they perform their function properly and to prevent contamination or damage.		*	
7	Provide procedures discrimination of idle equipment and not used unless they are repaired and calibrated.	*		
8	Indicate or identify all the equipment that need to be calibrated so as to indicate the status of calibration, including the date of last calibration and subsequent periodic calibration date .	*		
9	The laboratory have procedures for safe handling, transport, storage and use of reference standards and reference materials and so as to prevent contamination or damage and to maintain her privacy.		*	

• Strength points

1- The ability of equipment to achieve the required accuracy.
2- Calibration and inspection of equipment prior to their admission to the Service.
3- Provide procedures of idle equipment and not used unless they are repaired and calibrated.
4- Provide definition of all equipment that need to be calibrated.

•Weakness points

1- Not- supply the laboratory all sampling and measurement requirements.
2- Run equipment by authorized with a modern instructions for use and maintenance, partially verified.
3- partial definition of each unit of the equipment.
4- The lack of proper procedures for the ticker, transport, storage, use and planned maintenance of measuring instruments.
5- Lack of safe procedures for handling and transport, storage and use of reference standards and reference materials**.**

Table No.(19) compatibility assessment form for the sampling requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Available at the lab. plan and procedures for sampling when conducting sampling of materials or products for the purposes of testing and inspection or calibration and sampling plan are available at the site of a sampling	*		
2	Deviations, additions or exclusions are registered when the customer requests it, and included in the documents.	*		
3	Provides statistical methods for sampling operations in site include modeling procedures, choose the model, plan modeling, drag and create the model to obtain the required information.	*		
4	Provide Procedures for data recording and related processes of sampling.	*		

• Strength points

1- Provide a plan for sampling and provide a plan and procedures for sampling in site.
2- Recording deviations, additions or exclusions for a standard sampling.
3- The availability of statistical methods for sampling processes in site.
4- The data and related processes and procedures relating to registration of sampling, are available.

Table No. (20) compatibility assessment form of trading testing and calibration vocabulary requirements

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Matching the recipient's Sample with the information required for testing in terms of: -Required quantity for testing. -Identify testing standard specification. -Authorized name of the test results receipt.	*		
2	The laboratory have system to define samples and that this definition is retained by the presence of the sample in the laboratory .	*		
3	Provide procedures to assurance sample secret.			*
4	The laboratory have procedures for the transfer, receipt , handling, protection, storage and retention and / or destruction of samples.	*		
5	Provide appropriate inventory space and environmental conditions until delivery samples.			*
6	Availability training programs for staff members to ensure the continued of their efficiency in completing their tasks.		*	

• Strength points

1- Matching .recipient sample with the required information for testing.
2- Provide system to define samples and keep this definition through the presence of the sample in the laboratory.
3- Provide procedures for the transfer, receipt, handling, protection and storage and retention of samples.

• Weakness points

1- Partial Compatible to procedures for ensuring the secret of the samples.
2- Appropriate inventory space and environmental conditions for the samples, partially realized.
2- The lack of training programs for staff members**.**

Table No. (21) compatibility assessment form for the requirements of quality assurance testing and calibration results .

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	The laboratory have quality control for monitoring the validity of tests and calibrations.	*		
2	Quality procedures include regular use of reference materials and / or internal quality control by using secondary reference materials.		*	
3	Quality procedures include participation in inter-comparison programs between laboratories or efficiency testing programs.			*
4	Quality procedures include tests repeat or calibrations by using the same methods or different ways.			*
5	Quality procedures include linking the results of the different characteristics of a particular individual.		*	
6	The quality control data analysis and wherever you find it outside standard is taken to correct the problem and prevent recording uncorrected results.	*		
7	Available suitable inventory space and environmental conditions for the storage of audit samples.			*

• Strength points

1- Analysis of data and take action to correct the problem.
2- Provide quality control procedures.

• Weakness points

1- Lack of regular use of reference materials and / or internal quality control.
2-Participation in inter-laboratory comparison programs or examination efficiency programs, partially achieved.
3- Not repeat tests or calibrations using the same methods or different ways.
4- Not be linked to the results of the different characteristics of a particular individual.
5- Not available enough inventory space and appropriate environmental conditions to store the audit samples.

Table No. (22) compatibility assessment form for the requirements of the preparation of test reports

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Each test report contains the following information: -Name and address of the laboratory . - Special definition of test report and distinguish each page to make sure they are defined as part of the test report. -Name and address of the customer. -Identify the method used, -A description of the individual tested. -The date of receipt test single and the date of the testing process. -Reference to the sampling plan and procedures used by the laboratory. -Test results with measurement units. -The names and signatures and job titles of the examiners, auditors and authorized to give recommendations and conclusions.	*		
2	Provide procedures for protection of stored reports and appropriate environmental conditions and ensure easy retrieval.	*		
3	Provide procedures of determine reports retention period prior to disposal.	*		

• Strength points

1 -Contain the test reports on all the necessary information.
2- Provide procedures of protection stored reports and appropriate environmental conditions.
3- Determine reports retention period prior to disposal.

Table No. (23) compatibility assessment form for the requirements of the delivery test reports

No.	Requirements	Compatible	Not Compatible	partially Compatible
1	Provide procedures of the customer communication in cases of tests completion delays.			*
2	Provide procedures to identify the authorized(customer representative) receipt of the test report.	*		

• Strength points

1-Identify authorized the receipt of the test report.

•Weakness points

1-Partial compatible of communication with customer in cases of delays in the tests completion.

9. Conclusions

The following points have been drawn based upon the research work:

1. Do not be inspected of purchased supplies and reagents and consumable materials and verified as complying with standard specifications or requirements before they are used.
2. Partial compatible to secure communication with the customer for any delays or major deviation in the performance of tests and / or calibrations during the period of work.
3. Do not seek feedback, both positive and negative, from its customers and analysis of this information in order to improve the management system, testing and / or calibration activities and customer service.

4. Not carried out of the internal audit by trained and qualified personnel, independent of the activity to be audited because lack of available resources.
5. Lack of adherents training plans in the light of the training needs and skills required for each job related to the quality of test.
6. Lack of procedures to ensure the protection of the environment from pollution to prevent cross-pollution between them and environmental pollution and protect the environment from the tests waste.
7. Participation in inter-comparison programs between laboratories or efficiency check programs, verified partially, and not to repeat all tests or calibrations using the same methods or different ways

10.Recommendations

According to pre-conclusions, the following recommendations are educable :

1- Identify the similar Arab and international laboratory experiences and holding scientific and technical cooperation agreements during visit of countries laboratories, taking place at the international accreditation and the nomination of stuff to courses outside the country.
2- Create calibration laboratory in Civil Engineering Department / College of Engineering / University of Karbala, according to the International Standard ISO.
3- Conduct comparison with other laboratories with like performance for the purpose of identifying the best methods in order to dissemination and application.
4- Attempting to provide material and human resources for laboratories.
5- Documented laboratory tests reports on computer which retrieval easy .
6- Conduct periodic questionnaires for the purpose of external customer satisfaction measurement and analyzing the questionnaire results.

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