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BUILDING A LOCAL STANDARD SPECIFICATION FOR CONSTRUCTION LABORATORIES A THEORETICAL STUDY IN THE CONSTRUCTION LABORATORIES OF THE GENERAL COMPANY FOR THE IMPLEMENTATION OF TRANSPORT PROJECTS

Researcher

Saba Rafeh Numan

Ministry of Transportation

The State Company of execution for

Transport Projects

sabaarafeaa@gmail.com

Assistant Professor Dr.

Maha Kamel Jawad

University of Baghdad

College of Administration

& Economics

maha.k@coadec.uobaghdad.edu.iq

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Abstract

Purpose: Prepare a united standard local specification for laboratory tests and calibration for construction laboratories

Design / methodology / approach: Using a a methodical descriptive research by preparing a unified standard that combines a number of the ISO 17000 family specifications issued by the International Organization for Standardization (ISO) specified for laboratories to make the researched laboratory capable to conduct laboratory tests for the beneficiaries in practice and scientifically

Results: The standard included five fundamental requirements and thirty nine supplementary

Practical effects: This study theoretically concluded that applied the standard designed helps to measure any laboratory performance and comparison its results with other certified laboratories and put good opportunities for improvement and development.

Originality / value: The research is a tool to design an Iraqi locally standard design that fits with the reality of requirements for local businesses environment for structural laboratories.

Research Type: Printed paper research

Key words: Central Organization for Standardization and Quality Control, Specifications, ISO 17000 family specifications.

Introduction:

Laboratories are one of the important organizations in the business environment, whether they are medical or non-medical laboratories, and the construction laboratories are one of the laboratories of importance in achieving the requirements of the beneficiaries of the infrastructure projects, which are a real tributary to raising the level of services required in Iraq. The research idea came up from How to raise the efficiency levels of the performance of the researched laboratory and compare its performance with other certified laboratories, and the importance of the research focused on improving the reputation of the construction laboratories of execution for transport projects by standardizing steps and procedures and setting up indicators to evaluate the performance of laboratories based on

international standards, the research was divided into four sections, where the first topic included the methodology axis, while the second topic included the theoretical axis, which was divided into two chapters (the Central Organization for Standardization and Quality Control and the specification. The second chapter was for some specifications. The ISO 17000 family), while the third section was devoted to the practical focus of the research and presentation of the designed standard, while the research was concluded with the fourth study, which was devoted to the conclusions and recommendations reached by the two researchers.

The first topic / research methodology

First: the research problem

The problem of research and after investigation and research of what was mentioned in the libraries from international sources, references and publications is the existence of many international standards regarding laboratories and for each part of the laboratory. However, there's no such a unified specification that joins between laboratories parts in general. Therefore the following questions may pop up :

1- Is there a standard specefication for construction laboratories that can be adopted for all types of laboratories?
2- What are the currently approved specifications?
3- Is there an Iraqi standard specification for laboratories in general?

Second: The importance of research

The importance of the research was represented in the following points :

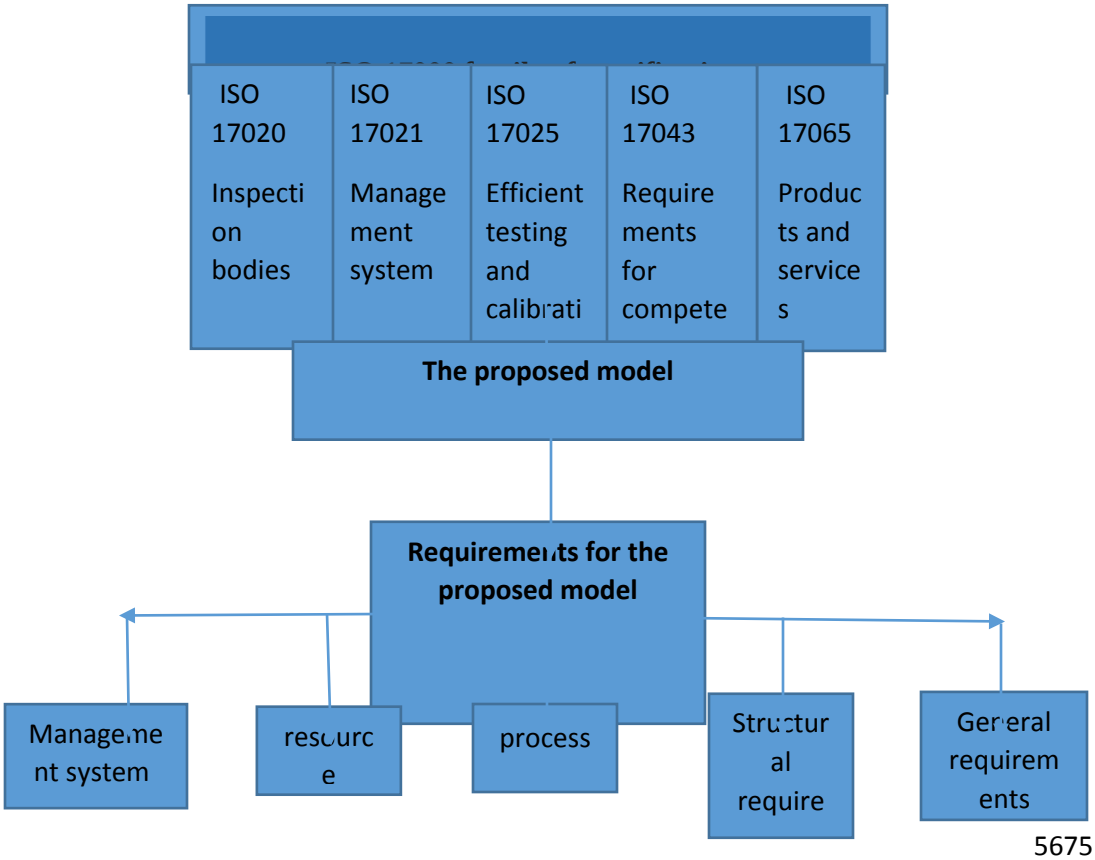
1- A modest attempt to help the Central Organization for Standardization and Quality Control (COSQC) to provide an Iraqi standard specification and proposed for laboratories
2- Providing public libraries with new specifications for different laboratories
3- Assist laboratories in their work according to a unified specification that includes all laboratory activities

Third: Research objectives

After reviewing the problem and the importance of the research, the objectives of the research are reflected as follows:

1- Presenting the international specifications of the ISO organization for laboratories, which is the ISO 17000 series
2- Collecting and unifying international standards in relation to laboratories
3- Building a unified standard specification

Fourth: The hypothetical outline of the research



Fifth: Research methodology

The research adopted the descriptive approach, which is considered suitable for preparing a standard specification with the adoption of the method of interviews, meetings, presentations and access to official documents (Kmash, 2016: 178) in addition to the scientifically experience of the researcher as she's one of the employees of the researched organization who virtually helped in identifying, diagnosing and evaluating items of importance.

The second topic / the theoretical side

The first section

Today's organizations, and specifically laboratories in general and engineering in particular, face many challenges to adapt to environmental changes due to competition pressure, which is increased by the lack of specific mechanisms that help these organizations to occupy advanced positions within their competitors and to adopt efficiency as one of the indicators necessary for this, so they are required to make changes in their orientations. By walking in the ranks of the advanced global steps, including the adoption of international standards as a basis for the performance of its laboratory activities. Therefore, commitments and conformity to the terms of both global and national standards have become imperative. The Central Organization for Standardization and Quality Control is one of the most important Organization which is in charge for specifications, preparation and publication in Iraq.

First: The Central Organization for Standardization and Quality Control

History of the device:

The Central Organization for Standardization and Quality Control is considered one of the most prestigious agencies, as it was established in 1979 under Law No. 54 issued on 4/6/1979. However, it was exist in the sixties of the last century, when its activities were practiced by the following authorities:(Cosqc.gov.iq)

The Iraqi Standards and Metrology Authority, which was established in 1963

General Industrial Research and Supervision Directorate

Directorate of Research and Control

Jewelery Labeling Circle

Currently, the device includes nine departments: (Al-Najjar and Jawad, 2017: 17-20)

1- Department of Measurements

2- Specifications section

3- Department of Quality Control

4- Department of Quality Management Systems

4- Department of Laboratory Analysis

5- Patents Department

6- Laboratory accreditation section

7- Jewelry labeling section

8- Department of Standardization Awareness Dissemination

The research will review the tasks of the specifications section, which are: (The National System for Quality Control, 1988: 3)

Preparing Iraqi standard specifications for all industries: construction, food, textile, chemical, etc.

Preparing the Iraqi standard specifications for safety and administrative systems.

Study and approve laboratory specifications for local products that do not have Iraqi local specifications.

Study and approve the technical requirements for imported materials that do not have Iraqi specifications

Granting exceptions from the application of some items of the Iraqi standard after being studied by the laboratory committees and approved by the headmaster of the agency

Cooperating with the Arabic Industrial Development and Mining Organization (AIDMO) and Arab standardization unions in order to prepare Arabic standards.

- Providing technical advice in the field of the Iraqi standard for various government departments, the private sector and importers.

Preparing studies in needed and according to the department's specializations.

Facilitating the work of the inspection program and pre-supply inspection for importers, which is one of the methods of quality assurance in the field of international trading.

- Participation in the work of the Arabic translation group of the International Organization for Standardization (ISO)

- Documenting Iraqi and laboratory standards -

Preparing, publishing and selling the Iraqi standard specifications and index of specifications

- Preparation of data published in Al-Waqi'i Iraqi newspaper with approved Iraqi specifications -
- Answer the inquiries that received from the relevant authorities regarding into sell the Iraqi standard specifications
The work field of the central system: (Al-Waqi'i, 2011: 6)
- The quality policy by setting up a qualitative policy for the country
Public awareness of programs, news, presentations and seminars, as well as honoring creative people
Upgrading the staff skills by providing courses, prensentations and conferences to them, also establish the scientific journal
Production and Marketing, provision and approval of Iraqi standards, monitoring, inspection and conformity of products and materials to the approved specifications
Import and export fields
Goals of the Standardization and Quality Control Centers: (Al-Najjar and Jawad, 2017: 20)
1- Provide protection for both the environment, the customer as well as the product
2- Devising national standards and providing standard specifications
3- Providing support and help for the technical developments and updates of the service and industrial sectors

Second: Defining the standard

The standard is an important part in many works, whether in providing service or products provision. Today's business specifications have become a foundation plan and a road map for all contracts within public or private sector contracts. The definition of the standard varies from a researcher to another. Part of them see that it's an abstract show for many requirements that must be fulfilled by a production process or an article, with reference to the method by which it can be determined their compliance with the requirements, and the specifications are divided in terms of the process of monitoring them To mandatory and optional specifications (Al-Alam, 2010: 21-22), Another opinion says that the specification means the administrative and technical requirements written to build a project and it's part of the contract documents and it is a description of the work to get done with the list of applicable references (ASCE, 2013: 21), as for (Elias, 2016: 4), sees that it is a document prepared unanimously and approved by a recognized body (standards agencies) that gives for common and repeated use, rules, instructions, or characteristics for specific activities, or gives its results with a view in order to achieve the optimum degree of the system in a specific context, while (Guide to Standard Gulf Standards Numbers Handbook, 2016: 2) indicated that it's a method of communication between all the stages that the product goes through and its inputs, It also includes a description of both the product, the materials use, methods of measurements and calibration, type of devices, method test and analysis. The method of storage and transportation, the percentage of discrepancy between products and the degree of quality, while (Al-Najjar and Jawad, 2017: 21) defined it as a legislative document based on scientific documents and technical results and the purpose from the existence of the standard is the desperate need to actually use it in addition to achieve quality, reliability, price, competitiveness of the product, the reduction of waste during the production process and the protection of the environment, according to the researchers

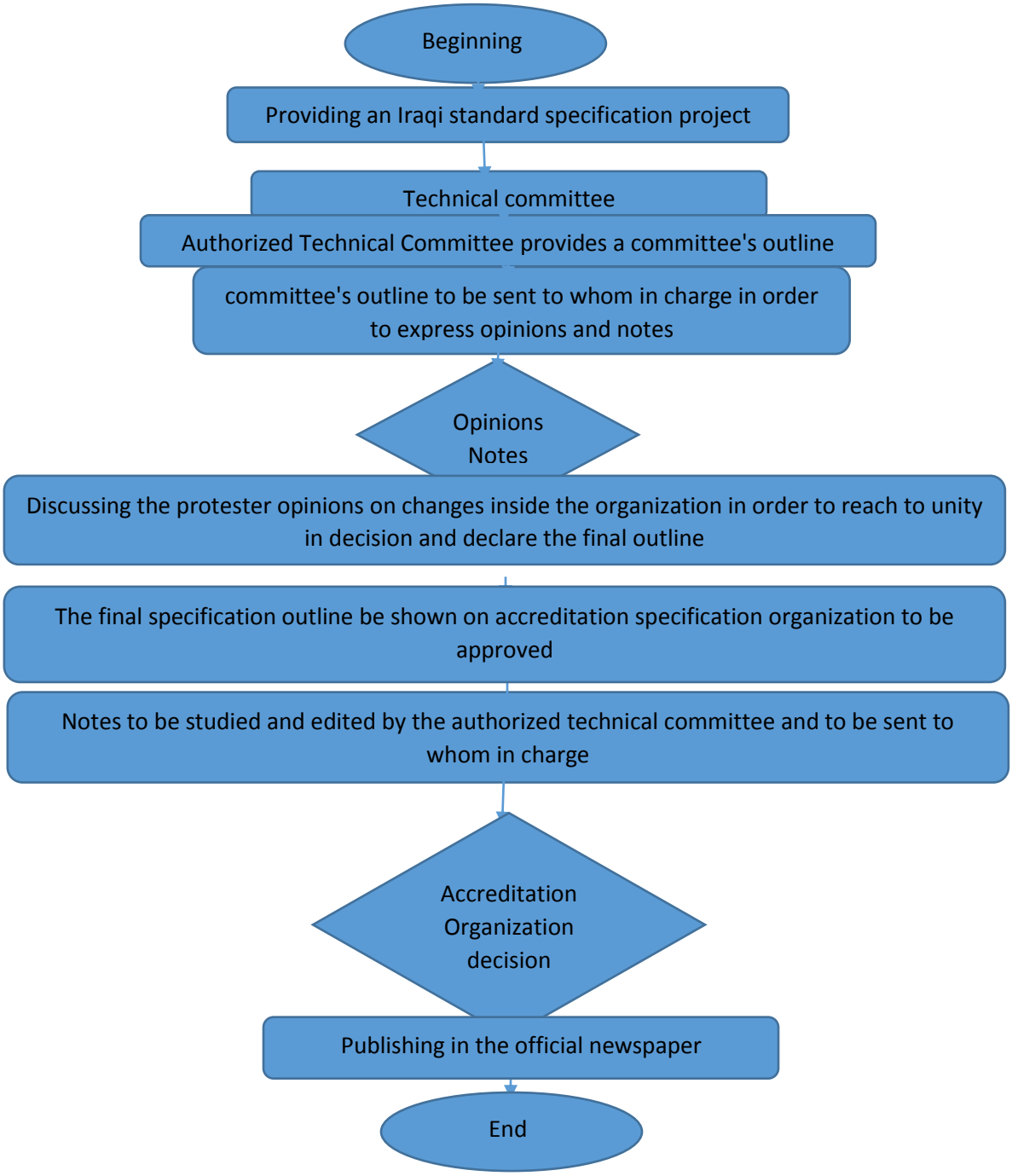
The researchers (Carnahan & Phelps, 2018: 7-8) consider that the standard is nothing but a document created by consensus to prepare a vital tool for industry and trade to enhance understanding of the market and facilitate trade exchange as the specifications cover many aspects of conformity and the evaluation process and describe the characteristics of the product through inspection, observation or other methods of assessing that conformity, and the researchers believe that the standard is the process of developing, preparing and formulating a set of conditions that must be met to perform a specific activity in which the required output exceeds the desires of the beneficiaries

Third: Specification properties

There is a group of characteristics that the specifications have in common: (Aqili et al. 2008: 172-173)
1- Simplicity, accuracy and clarity
2- Moderation in the description
3- Supporting specifications with engineering drawings whenever needed
4- The specifications are as close as possible to the general standard specifications in order to reduce the cost
While (Al-Jubouri, 2008: 217) indicated other characteristics of the specifications, as follows:
1- Responding to market needs
2- Responding to scientific and technical developments in different countries

Fourth: The standard specification development stages

Standardization and specification organizations have a fundamental role in specifications and their development, so these organizations provide a framework and a mechanism of action through which specifications are prepared and the processes of preparing, issuing, circulating, maintaining and reviewing them at regular intervals. This is in line with the chart (2) below, which clarifies the stages of preparing an Iraqi standard specification. By the Central Organization for Standardization and Quality Control.



Scheme (2) stages of preparing an Iraqi standard
Source: Central Organization for Standardization and Quality Control, Standardization Department / Standards Section, (2018), Iraqi standard specification preparation procedure, pg.7

The second chapter
The ISO 17000 family
The ISO (International Organization for Standardization) is a global federation of standards agencies within which international standards are prepared and it consists of a group of members. Work is done within this organization to facilitate and prepare standard specifications by technical committees. The work is divided among these committees so that each member is a representative for a specific topic In addition to the participation of governmental and non-governmental organizations around the world in coordination with the International Organization for Standardization (ISO / IEC 17025, 2017: 1) The organization also specializes in issuing many specifications, the most famous of which is the ISO 9001 specification and the ISO 17000 specification for laboratories. Many researches have dealt with the ISO 9001 specification with little to the ISO 17025 specification while ignoring the other specifications, so we presented these specifications in view of their great importance, since the work can't be done without the procedures of tests and analyzes in laboratories, Neither the doctor will be able to diagnose the diseases nor the engineer will be able to complete the construction work of his assigned projects.
First: the definition of the standard ISO 17020
Based on what was mentioned recently about ISO specifications according to the hypothetical outline of the search and the first impression of the components of the designed standard, a set of definitions for those specifications and their basic requirements will be indicated as follows:
They are the standards adopted to enable accreditation agencies to harmonize their application of the standards according to which they are obligated to evaluate the inspection agencies (Guidance on the Application of(ISO / IEC 17020,2004: 4).
The (British Standard, 2012: 1) has defined it as : Requirements document for accreditation to enhance confidence in the inspection agencies by conducting the assessment to conform to the regulations and standards, while(Ehrhardt ,2012: 66) indicated that it is the implementation of processes under standardization standards to improve methods and processes that are used as standards compared to other methods, and the ISO 17020 standard can be defined according to the researchers' opinion. : It is an international standard document prepared to fulfill a set of requirements for auditing organizations to assist them in granting the certificate to organizations wishing to obtain a qualification or accreditation certificate.
The basic requirements of ISO 17020 can be summarized by five requirements as follows:

ISO 17020
Conformity assessment — Requirements for the operation of various types of agencies performing inspection
4-General Requirements
5-Structural Requirements
6-Resource requirements
7-Process Requirements
8-Management system requirement

Weakness in the standard, according to the researchers' opinion:
Through the requirements presented above, it was found that there are neither technical requirements nor informational requirements, and this means the lack of indications of mechanisms for evaluating performance, defining, designing and documenting statistical methods, designing and planning a proficiency testing system, technical expertise required for testing, calibration or sampling, the amount of consistency and stability In evaluating performance, availability and availability of information, including auditing, certification or any other information, preparing a guide for making the information available to customers through broadcast media such as the Internet, Advertisements, documents, not to allow the use of the accreditation document or the certificate or all or part of it in shadowing, correcting advertising materials when reducing the scope for granting the certificate.
Second: ISO 17021 standard
The two researchers review the opinions of some researchers regarding the requirements of auditing and licensing **agencies**, as follows:

It is a set of requirements for the issuance of a quality system management certificate, and thus this certificate adds a higher value to both the organization, customers and stakeholders (ISO / IEC17021,2006: 1). To define, document and monitor acceptance criteria and other aspects of safety performance, and (Jelana, 2012: 77-79) defines them as standards.

The international review of certification **agencies** is to audit and approve management systems in the organization's ability to meet its needs and the needs of its customers. Match those organizations to the required standards.As for its basic requirements, it can be summarized as follows, which consist of seven requirements, which are as follows:

ISO 17021

Conformity assessment –Requirements for agencies providing audit & certification of management systems

4- PRINCIPLES

5-general requirement

6-structural requirement

7-Resource requirement

8-Information requirement

9-Process requirement

10-Management system requirement for certification agencies

Weaknesses of ISO 17021:

After reviewing the requirements of the standard and its sub-clauses, it is found that the standard discussed contains seven basic requirements, which is the highest outcome among the requirements for all the specifications examined, but it lacked the technical requirements through which performance is compared and evaluated, procedures for competency examination, statistical designs. although there are existing resource requirements, It did not refer to the material resources, buildings, environmental conditions, or any other related requirements, or any other structural requirements. It did not address the mechanisms of communication and mutual relations, and it referred to responsibilities, powers and authorities only, in addition to that the mechanism for achieving impartiality in controlling operations was not specified. .

Third: Definition of the standard ISO / IEC 17025

Although the ISO 17025 standard is one of the most common standards in the academic research fields, the two researchers will review the opinions of some researchers in defining the researched standard and as follows: (Hashem, 2010: 20) is a global recognition for granting the laboratory Official global credibility by strengthening the laboratory's ability to provide reliable testing or calibration services that satisfies the customer and achieves the laboratory's technical competence and enhances its ability to achieve the relevant specifications, As for (Thompson, 2018: 2) and (pangat, 2018: 9)

They defined it as a system to ensure neutrality, consistency and reliability for testing or calibrating laboratories and from the first time "once right …… always right". (Carnahan & Phelps, 2018: 9) is to specify the requirements for the competency of laboratories to conduct tests or calibration and how to implement both of them using standards or methods

In order to obtain valid results that help enhance the customer's confidence, standard 17025 can be defined by the researchers as an international standard methods that work to achieve the accuracy of laboratory results in the examination and calibration fields, which require those methods from the competent laboratories to fulfill all their details to achieve confidence and credibility in their results

The two researchers review the basic requirements of ISO 17025 with five requirements as follows:

ISO 17025

General requirements for the competence of testing and calibration laboratories

4-general requirement

5-structural requirement

6-resource

7-Process requirements

8-Management system requirements

Weaknesses of ISO 17025:

After studying the basic requirements and their sub-clauses for the specification, it was found that although it contained five requirements, including the structural requirements, it did not specify in details neither the special responsibilities for the laboratory staff, quality officials nor the duties for the laboratory manager and his validity, as well as referring to the signature of the laboratory director in the technical reports for examination or calibration within Operations requirement, lack of reference to the possibility of applying computerized systems for managing and retrieving technical and administrative information and data and restore them, as well as neglecting a precaution.

Third: Definition of ISO 17043 specification

One of the specifications required to measure laboratory efficiency and the possibility of comparing performance with other staid laboratories is the ISO 17043 specification. The two researchers will review a group of researchers 'opinions by defining the researched standard, which is: A set of procedures for examining the competency of laboratories as an evaluation of their performance, identifying their problems and initiating improvement measures (national institute of standard technology, 2010: 12) It is a set of standards specified as a general basis (Lehmann ,2012: 374) considers (keungLiet.al, 2012: 1) to be a mandatory accreditation requirement for participation in proficiency tests for laboratory proficiency programs and the correctness of the work method in both technical and administrative terms. It can be defined by the two researchers. As a series of international conditions and controls for suppliers of testing the efficiency of laboratory performance and comparing performance with other staid laboratories.

With regard to the basic requirements of ISO 17043, it consisted of two requirements, namely:

ISO 17043

Conformity assessment –General requirement for proficiency testing

4-Technical requirement

5-management system requirement

Weaknesses: After reviewing the requirements of Standard 17043, it was found that it consists two requirements: the technical requirements and the administrative requirements, Other requirements have been neglected in: general, resources, structural and operations, and it only summarized on two basic requirements and that refers to a lack in : procedures of updating evaluation methods, integrity and neutrality, risks and opportunities.

Fifth: ISO 17065 standard

With regard to the requirements of products, services and operations, the ISO organization has prepared a set of special requirements under the name of ISO 17065 specification, whose definition can be reviewed by some researchers as follows:

They are the requirements for implementing certification activities with ease of approval by issuing **agencies** at the local and international level and thus stimulating international trade (Fauziyah et al, 2019: 1). They are the international guidelines for standards for certification institutions for products, processes and services provided for acceptance on (Admaja, 2013: 223) at the national level. And internationally, a set of standards that signifies approval that the service or product provided is locally and internationally accredited (ISO / IEC 17065, 2012: 2)

Finally, the basic requirements of ISO 17065 can be summarized with five requirements, as follows:

The standard ISO 17065 can be defined as the international standards for certifying the quality of a product or service provided according to its fulfillment of those standards.

ISO 17065

Conformity assessment — Requirements for agencies certifying products, processes and services

4-general requirement

5- structural requirement

6-resource

7- process requirement

8- management system requirement

9-Further additional requirements

Weaknesses of the standard ISO 17065:
Although the standard contains six requirements, it lacked some items, including: neutrality, cause analysis, test and calibration report, measurement, evaluation of uncertainty of measurements.
And if the researched specifications agreed in terms of general requirements, with the exception of the ISO 17043 standard, which did not contain any indication of the existence of general requirements, and instead of them there were two requirements, namely the technical requirements and the administrative requirements, the two researchers prepared an assessment of the extent to which the specifications contained the items The sub-standard, collected and unified within a percentage ranging between 25-100%, where the evaluation was considered as ranges or allowances for the existence of those items within the standard, and whenever the item got repeated in a specification, it was evaluated at 25% on the assumption that the model consisted of four specifications instead of five to exclude the ISO standard 17020 for the researched laboratory, as it is exclusively for the inspection **agencies**, and all the specifications discussed agreed on the existence of the management system requirement, but he found a weakness in Aspects of the improvement item that obtained 50%, documentation changes 25%, cause analysis 25%, selection and implementation of corrective measures 25%, preventive measures 75%, running the competency inspection system 25%, statistical design 25%, performance evaluation 25%, evaluation Results 25%, complaints 50%, opinions and explanations reports 25%, compliance reports 25%, calibration requirements 25%, inspection report requirements 50%, submission of results 25%, general requirements for inspection reports 50%, validity assurance of results 25%, unconfirmed assessment Measurement 50%, technical records 50%, sampling 25%, selection of methods and procedures 50%, review of requests 50%, products and services provided from abroad 25%, measurement 25%, equipment and supplies 50%, material resources 50%, liability 50% 50%, organizational structure.
No matter how varied the numbers of the requirements of the ISO 17000 standard family are between what are five or seven requirements, but the two researchers articulated, after study, investigation and in-depth research on those items and requirements, and as mentioned in the design of the practical system for the proposed standard, the proposed standard consisted of five basic requirements, as is the case in most of the specifications discussed In the study, in line with the preparation of a set of requirements that are consistent and compatible with the special needs of the construction laboratories and in harmony with the reality of the work environment of those laboratories in the Iraqi work environment in particular.

The third topic / the practical axis
An introduction
This study seeks to prepare a unified Iraqi standard specification for construction laboratories and in order to achieve the desired goals and in line with the subject of the study, and to achieve all this it was necessary to identify some of the specifications of the ISO 17000 family, specifically specification 17020, 17021, 17025, 17043, and 17065, where the preparation of the standard is required. Iraqi knowledge, research and review of the five specifications mentioned, as was done in the second topic Each standard is concerned with its own axis, as Standard 17020 refers to the requirements for the performance of operating different types of inspection **agencies** or **agencies**, while Standard 17021 is concerned with the reliability of the management system, while Standard 17025 is concerned with the requirements and conditions of laboratory tests and calibration procedures. As for Standard 17043, it is concerned with the suppliers and providers of competency testing, and finally Standard 17065 focused on the requirements of services, products and processes. In order to be familiar with the aspects of the study to prepare the desired standard, and after reviewing the above-mentioned specifications, the researcher found that there are some The specifications that do not apply to the actual reality of the laboratory researched in the standard itself, including

the standard 17020, so the researcher decided to cancel those channels related to the requirements of the inspection **agencies**, as for the specification 17021 and upon reviewing it it was found that there are some paragraphs within the standard that are among the requirements of the standard designed for its close connection with the actual reality of the laboratory The respondent, there are some requirements in the four specifications that did not obtain a percentage for choosing them within the model, but in the practical reality of the laboratory, the research sample has significance due to the presence of repeated cases during the conduct of the tests and in general, the items of the designed standard, which formed 50% or more of the requirements, were chosen for those The four specifications, as for some requirements that formed 25%, were included within The model for its importance within the laboratory The research sample, requirements and the remaining items, which accounted for less than 50% and had no significance in the actual reality of the laboratory, as they were not included in the designed specification. In order to give the designed specification a practical and academic legitimacy, meetings and meetings were held with many workers In the research laboratory and the National Center for Construction Laboratories and with specialists in the Central Organization for Standardization and Quality Control and a number of representatives of private companies specialized in quality, the designed standard has been welcomed and accepted by the specialists.

Designed specification:

After reviewing and studying the researched specifications, the two researchers were able to design the required standard as follows:

Table (1) of the designed specification

no	Standard and its subsidiaries
4	general requirement
5	structuralequirement
6	resource equirement
7	process
8	management system
4	general requirement
4-1	Impartiality
4-2	confidentiality
5	structuralequirement
5-1	legal requirement
5-2	responsibility
5-3	requirement of laboratory's customers
5-4	organization &management structure
6	resource
6-1	General
6-2	Personnel
6-3	Facilities&EnvironmentalConditions
6-4	Equipment & Accomedation& Environment
6-5	Metrological traceability
6-6	Externally Provided Product & Services
7	process
7-1	Review of request ,tenders& contract
7-2	Selection ,verification &validation of methods
7-3	sampling
7-4	Technical records
7-5	Evaluation of measurement uncertainty
7-6	Ensuring the validity of result

-77	**Reporting of result**
7-8	**Specific requirement for test reports**
7-9	**Specific requirement for calibration certificates**
7-10	**Reporting statements of conformity**
7-11	**Reporting opinions &interpretations**
7-12	**Complaints**
7-13	**Nonconforming work**
7-14	**Control of data & information management**
7-15	**Evaluation of performance**
7-16	**Design of proficiencytesting schemes**
7-17	**Homogeneity & stability**
7-18	**Statistical design**
7-19	**Operation of proficiency testing schemes**
8	**Management system requirements**
8-1	**General**
8-2	**Management system documentation**
8-3	**Control of management system documents**
8-4	**Document change**
8-5	**Control recordes**
8-6	**Improvement**
8-7	**Corrective action**
8-8	**Internal audit**
8-9	**Management reviews**
8-10	**Preventive actions**

The source is prepared by the two researchers

In light of the theoretical aspects that have been presented, it was concluded that the designed standard consisted of five requirements represented and in order: general requirements, structural requirements, resources, operations requirements, ending with the management system, and a number of sub-clauses with the fact of forty-one clauses, and this means that the designed standard tried to cover the largest possible number of requirements and their items of importance in laboratory activities from a practical and theoretical point of view, and as the details of the sub-items are shown according to their requirements in Table (2) as follows:

Table (2) Summary of the number of sub-items of the designed standard

Percentage for sub-items%	Number of sub items	**requirement**	**No.**
%4.87804878	2	**general**	**1**
%9.75609756	4	**Structural**	**2**
%14.6341463	6	**resource**	**3**

%46.3414634	19	**process**	**4**
%24.3902439	10	**Management system**	**5**
%100	41	**total**	**6**

It is clear from Table (2) that the highest percentage obtained by the operations requirement in terms of the number of sub-items, and this confirms the importance of this requirement in terms of details and explanation of paragraphs, which the designed standard focused on.

Conclusions:

After completing the theoretical and practical sides of the research, a set of conclusions were reached, among the most important of which were the following: Standardization of the standard within the framework of five unified basic requirements consisting of general requirements, structure, resources, operations, and management system in total of forty-one sub-items. And the number of those sub-items varied for those requirements between items (2-19).

The number of sub-requirements was not standardized and equal in all the five requirements due to the different nature of the activity of each requirement, as two items were specified for the general requirements, the structural requirements focused on four items, while the resource requirements included six items, while the operations included nineteen items and finally, the share of an item The management system consists of ten sub-items.

The operations requirement will be discussed and its clauses clarified because it is the most important requirement. Where it's focused on laboratories activities starting from reviewing contracts, applications, certify them, understand them, ability to get them done, put all reviewed procedures, necessary resources to get them done. Determine the methods, make them available, update them such as instructions and related standards to laboratories activities and put a plan and method to pull samples. Taking care of without confirming the measurement for either the performance or the measurement itself for all calibrations and errors in order to take samples and evaluations of the proficiency testing program, with the need for a procedure to monitor the validity of the results in order to ensure them. The need for the results to be presented accurately, objectively and clearly, and not neglected The designed specification alongside complaints, on the contrary focused on a documenting process for receiving, evaluating and making decisions regarding complaints.

As for the non-conforming work side, the specification indicated the necessity for a procedure to determine responsibilities and powers related to managing non-conforming work, and through the availability of information and its compatibility with all requirements and its treatments for all means Data for data control and information management in order to evaluate performance, the standard indicated the use of appropriate evaluation methods, and in order to design competency examination schemes, the specification indicated the development and implementation of the necessary procedures to ensure the examination with the development and documentation of appropriate standards for homogeneity and stability, taking into account the aspects of statistical design depending on the nature of the data (quantitative or qualitative) and statistical assumptions. The nature of the errors and the expected number of results, taking into account the official documented notification of all participants to operate the competency examination system.

Recommendations:

Based on what was reviewed, the study reached a set of recommendations as below:

Designing and implementing records to keep reviews of contracts and requests, Choosing methods based on what is published by reputed technical organizations, scientific texts or scientific magazines, Providing and making a plan available, and method for taking samples at work sites, Designing and implementing technical records that include reports and work results, Documenting competency testing evaluations, Displaying the results in the form of reports, including what Reports for testing, calibration and other reports for sampling, reports for conformity data, and others for opinions and interpretation.

Complaints outputs should be done, reviewed and approved by individuals who are not involved in the original laboratory activities concerned, Implementing corrective actions for non-conforming work in case of repetition, Protecting data and information from vandalism and unauthorized entry, Documenting of the valuation methods used.

The proposals:
Generalization the experience of applying the standard designed after measuring its results and effects in the researched laboratory as a guideline for laboratories operating in the structural testing sector.

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