ISO 9000 and 14000

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ISO 9000

- Series of standards, developed and published by the International Organization for Standardization (ISO)
- Define, as establish, and maintain an effective quality assurance system for manufacturing and service industries.
- ISO is a non-governmental organization established in 1946 in Geneva, Switzerland
- The ISO 9000 family of standards is related to quality management systems and designed to help organizations ensure that they meet the needs of customers while meeting legal and regulatory requirements.
- It deals with eight management principles on which the family of standards is based.

- International standards promote international trade by providing one consistent set of requirements recognized around the world.
- ISO 9000 can help a company satisfy its customers, meet regulatory requirements and achieve continual improvement. It provides the base level of a quality system, not a complete guarantee of quality.
- Originally published in 1987 by the ISO, a specialized international agency for standardization composed of the national standards bodies of 90 countries.
- Greek word – *isos* meaning equal

- Standards are documented agreements containing technical specifications or other precise criteria to be used consistently as to ensure that rules, guidelines, materials, products, processes and services are fit for their purpose

Need of ISO

- Main factors are "Quality and Standardization" around the world
- Worldwide progress in trade liberalization

-- Interpenetration of sectors

-- Worldwide communications systems

-- Global standards needs for emerging technologies

-- Developing countries

ISO 9000 objectives

- It defines quality system standards To meet five objectives

1. Achieve, maintain and seek to continuously improve product quality [including services] in relationship to requirements
2. Improve the quality of operations
3. Provide confidence to internal management
4. Provide confidence to customers
5. Provide confidence that quality system requirements are fulfilled

Advantages

- Quality is maintained
- ISO registration also has a significant bearing on market credibility as well.
- Opportunity to compete with larger companies
- More time spent on customer focus
- Confirmation that your company is committed to quality
- May facilitate trade and increased market opportunities
- Can increase customer confidence and satisfaction.

ISO 9000 series Quality Management Principles/elements

- It based on seven quality management principles
- QMP 1 – Customer focus
- QMP 2 – Leadership
- QMP 3 – Engagement of people
- QMP 4 – Process approach
- QMP 5 – Improvement
- QMP 6 – Evidence-based decision making
- QMP 7 – Relationship management

Principles/Elements of ISO

- **Principle 1** – Customer focus Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.
- **Principle 2** – Leadership Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the objectives.
- **Principle 3** – Engagement of people at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

- **Principle 4** – Process approach A desired result is achieved more efficiently when activities and related resources are managed as a process.
- **Principle 5** – Improvement of the organization's overall performance should be a permanent objective of the organization.
- **Principle 6** – Evidence-based decision making Effective decisions are based on the analysis of data and information.
- **Principle 7** – Relationship management An organization and its external providers (suppliers, contractors, service providers) are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

ISO 9000 series

Series	Description
ISO 9000	Explains fundamental quality concepts and provides guidelines for the selection and application of each standard
ISO 9001	Model for quality assurance in design, development, production, installation and servicing.
ISO 9002	Model for quality assurance in the production and installation of manufacturing systems
ISO 9003	Quality assurance in final inspection and testing
ISO 9004	Guidelines for the applications of standards in quality management and quality systems.

Steps in ISO 9000 registration process

1. Identification of key drivers
2. Obtaining the standard
3. Defining strategy
4. Planning and availability of resources for developing the quality management system
5. Understanding processes
6. Determining training needs
7. Developing management system documentation
8. Implementing Quality Management system
9. Pre-assessment audit
10. Certification

ISO 14000

- ISO14000 is a family of standards related to environmental management that exists to help organizations
- Minimize operations: negatively affect the environment
- Comply with applicable laws, regulations, and other environmentally oriented requirements
- ISO 14000 is similar to ISO 9000 quality management
- The requirements of ISO 14000 are an integral part of the European Union‘s Eco Management and Audit Scheme (EMAS)

EMS

- An environmental management system (EMS) is a management structure that allows an organization to assess and control the environmental impact of its activities, products or services.
- ISO 14000 gives International Voluntary Standards for providing common framework for managing environmental issues
- ISO 14000 is Product and Process oriented
- Determines environmental impacts of products and services; establish, maintain and evaluate EMS
- ISO 14000 is Process NOT a Performance standard

Elements / principles of ISO 14000

- Environmental Management System (EMS)
- Environmental Auditing and related investigations (EA)
- Environmental Labels and Declarations (EL)
- Environmental Performance Evaluation (EPE)
- Life Cycle Analysis & Terms and Definition (LCA)
- Environmental aspects in product standards (EAPS)

Benefits of ISO 14000

- Reduces environmental liability
- Enhances public image and reputation
- Assures customers
- Satisfies investor criteria
- Meets your clients' registration requirements
- Reduces your consumption of materials and energy
- Facilitates permits & authorizations
- Reduces the cost
- Improve industry-government relations

ISO 14000 series

ISO14000	Guide to Environmental Management Systems: General Guidelines
ISO 14001	Environmental management systems-Specification with guidance for use
ISO 14004	Environmental management systems-General guidelines on principle, systems, and supporting techniques
ISO 14010	Guidelines for environmental auditing-General principles of environmental auditing
ISO 14011/1	Guidelines for environmental Auditing-Audit procedures-Auditing of environmental management systems
ISO 14012	Guidelines for environmental auditing-Qualification criteria for auditors
ISO 14013	Management of Environmental audit programs
ISO 14014	Initial reviews
ISO 14015	Environmental site assessments
ISO 14020	Environmental labeling-General principles
ISO 14021	Terms and definitions for self-declaration environmental claims
ISO 14022	Environmental labeling-symbols
ISO 14023	Environmental labeling-testing and verification methodologies
ISO 14024	Environmental labeling-guiding principles, practices and criteria for multiple crite-

Steps in ISO 14000 registration process

1. Identification of key drivers
2. Access to resources and defining strategy
3. Discussion with certification body
4. Gap analysis
5. System integration
6. Development of EMS
7. Identification of legal and other requirements
8. Complete the EMS development
9. Implementation of EMS
10. Certification

Thank you...

NABL Accreditation

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Introduction

- NABL is an autonomous society, under DST providing Accreditation (Recognition, official approval, certification) of Technical capability of a testing, calibration, medical laboratory & Proficiency testing
- NABL stands for **National Accreditation Board For Testing And Calibration Laboratories.** NABL has agreements with ILAC (International Laboratory Accreditation Conference) and APLAC (Asia Pacific Laboratory Accreditation Co-operation). These are especially valuable for International recognition and mutual acceptance of test results. In short accreditation has worldwide acceptance.

- NABL is an autonomous body under the Department of Science & Technology, Government of India, and is registered under the Societies Act.
- It is only one of its kinds that assess laboratories in India for quality and consistency in the results. The concept of Laboratory Accreditation was developed to provide a means for third party certification of the competence of laboratories to perform specific type(s) of testing.

- **NABL Vision**

  To be the world's leading accreditation body and to enhance stakeholders' confidence in its services.

- **NABL Mission**

  To strengthen the accreditation system accepted across the globe by providing high quality, value driven services, empanelling competent evaluators, creating awareness among the stake holders, initiating new programs supporting accreditation activities and pursuing organizational excellence.

Benefits of NABL

- Increased confidence in Testing/ Calibration Reports issued by the laboratory
- Better control of laboratory operations
- Potential increase in business due to enhanced customer confidence and satisfaction.
- Customers can search and identify the laboratories accredited by NABL for their specific requirements from the NABL Web-site or

  Directory of Accredited Laboratories
- Users of accredited laboratories enjoy greater access for their products, in both domestic and international markets.
- Savings in terms of time and money due to reduction or elimination of the need for re-testing of products.
- Maintenance of Quality

- **TESTING LABORATORIES**

  Biological, Chemical, Electrical, Electronics, Fluid-Flow, Mechanical, Non-Destructive Testing, Radiological, Thermal, Forensic

- **CALIBRATION LABORATORIES**

  Electro-Technical, Mechanical, Fluid Flow, Thermal & Optical Radiological

- **MEDICAL LABORATORIES**

  Clinical Biochemistry, Clinical Pathology, Haematology & Immunohaematology, Microbiology & Serology, Histopathology Cytopathology, Genetics, Nuclear Medicine (in-vitro tests only)

- **Proficiency testing providers:**
- Testing, Calibration, Medical, Inspection, Chemical Composition, Biological & Clinical Properties, Physical Properties, Engineering Properties, etc.
- **Reference material producers:**
- Chemical Composition, Biological & Clinical Properties, Physical Properties, Engineering Properties, etc.

Process of Accreditation:

- **Stage I (Filling of Application):**
- Prepare your laboratory's application for NABL accreditation, giving all desired information and enlisting the test(s)
- Laboratories are required to submit **five sets** of duly filled in application forms for each field of testing / calibration along with five sets of Quality Manual and **Application Fees.**
- **NABL Secretariat** on receipt of application will issue acknowledgement to the laboratory. After scrutiny of application for it being complete in all respects, a unique Customer Registration Number will be allocated to laboratory for further processing of application.
- NABL Secretariat shall then nominate a **Lead Assessor** for giving Adequacy Report on the Quality Manual / Application submitted by the laboratory.
- After satisfactory corrective action by the laboratory, a Pre-Assessment audit of the laboratory will be organized by NABL. Laboratories must ensure their preparedness by carrying out its internal audit before Pre-Assessment.

- **Stage II (Pre-Assessment audit):**
- Carried by **Lead Assessor** at the laboratory sites.
- The pre-assessment helps the laboratory to be better prepared for the Final Assessment. It also helps the Lead Assessor to assess the preparedness of the laboratory to undergo Final Assessment apart from Technical Assessor(s) and Total Assessment.
- A copy of Pre-Assessment Report will be provided to Laboratory for taking necessary corrective action on the concerns raised during audit, if any.
- The laboratory shall submit Corrective Action Report to NABL Secretariat.
- After laboratory confirms the completion of corrective actions, Final Assessment of the laboratory shall be organized by NABL.

- **Stage III (Final Assessment):**
- NABL Secretariat shall organize the Final Assessment at the laboratory site(s) for its compliance to NABL Criteria and for that purpose appoint an assessment team.
- The Assessment Team shall comprise of a Lead Assessor and other Technical Assessor(s) in the relevant fields depending upon the scope to be assessed.
- Assessors shall raise the Non-Conformance(s), if any, and provide it to the laboratory in prescribed format so that it gets the opportunity to close as many Non-Conformance(s) as they can before closing meeting of the Assessment.

- **Stage IV (Corrective Reassessment):**
- After satisfactory corrective action by the laboratory, the Accreditation Committee examines the findings of the Assessment Team and recommends additional corrective action, if any, by the laboratory.
- Accreditation Committee determines whether the recommendations in the assessment report is consistent with NABL requirements as well as commensurate with the claims made by the laboratory in its application.
- Laboratory shall have to take corrective action on any concerns raised by the Accreditation Committee.
- Accreditation Committee shall make the appropriate recommendations regarding accreditation of a laboratory to NABL Secretariat.
- Laboratories are free to appeal against the findings of assessment or decision on accreditation by writing to the Director, NABL.

- **Stage V (Granting of Accreditation):**
- Accreditation to a laboratory shall be valid for a period of 3 years and NABL shall conduct periodical Surveillance of the laboratory at intervals of one year.
- Laboratory shall apply for Renewal of accreditation to it at least 6 months before the expiry of the validity of accreditation.

Thank you...

Quality Assurance and Quality management concepts

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Quality

- Quality of pharmaceutical product means-
- Safety
- Purity
- Efficacy
- Uniformity
- Identity

Quality


Safety in handling and use
Supplied innovation
Effect in customer application
Quality
Product uniformity
Assurance of delivery
Environ-mental acceptability
Customer service
Product stability

Quality Assurance

- “Quality assurance” is a wide-ranging concept covering all matters that individually or collectively influence the quality of a manufactured product.

- Quality assurance therefore incorporates GMP and other factors, such as product design and development.

Functions/ responsibilities of QA

Quality Assurance-Highlights

- In process quality checking in manufacturing
- Validation of facilities, equipments, process, products and cleaning
- Complaint handling
- Storage of quality records and control samples
- Stability studies

Activities of QA Department

- Technology transfer
- Validation
- Documentation
- Assuring quality of products
- Quality improvement plans

Quality management

- It is the aspect of management function that determines and implements the "**quality policy",** i.e. the overall intention and direction of an organization regarding quality.

- The basic elements of quality management are: ′ an appropriate infrastructure or "quality system", procedures, processes and resources; systematic actions necessary to ensure adequate confidence that a product (or service) will satisfy given requirements for quality.

Quality control (QC)

- A system of maintaining standards in manufactured products by testing a sample of the output against the specification.
- ISO 9000 defines QC as "A part of quality management focused on fulfilling quality requirements".
- It is that part of GMP concerned with sampling, specification and testing, documentation and release procedures which ensure that the necessary and relevant tests are performed and the product is released for use only after ascertaining its quality.

Functions/responsibilities of QC

- **QC is responsible for –**
- Day to day control of quality within the company.
- Analytical testing of incoming raw materials and inspection of packaging components, including labeling, they conduct in-process testing when required,
- Testing of finished dosage form.
- Selection of qualified vendors from whom raw materials are purchased.
- Testing and inspection of manufacturing area

Correlation of QA, QC and GMP

Difference between QA and QC

Quality Assurance	Quality Control
Process oriented	Product oriented
Set of activities for ensuring **quality in the processes** by which products are developed	Set of activities for ensuring **quality in the products.**
Managerial tool	Corrective tool
Aims to prevent defects with a focus on the process used to make the product	Aims to identify and correct defects in the finished products.
Manages the quality	Verifies the quality

Good manufacturing practices (GMP)

- GMP is a part of quality assurance which ensure that the products are consistently produced and controlled according to quality standards appropriate to their intended use.
- GMP – A set of principles and procedures which, when followed by manufacturers for the therapeutic goods, helps ensure that the products manufactured will have the required quality.
- It is designed to minimize the risks involved in any pharmaceutical production that cannot be eliminated through testing the final product.

Good manufacturing practices (GMP)

- **GMP COVERS:**
- All aspects of production; from the starting materials, premises and equipment to the training and personal hygiene of staff.
- Detailed, written procedures are essential for each process that could affect the quality of the finished product.
- There must be systems to provide documents proof that correct procedures are consistently followed at each step in the manufacturing process every time a product is made.

Good manufacturing practices (GMP)

- **Principles of GMP:**

- GMP is that part of quality management which ensures that products are consistently produced and controlled according to the quality standards appropriate to their intended use and as required by the marketing authorization, clinical trial authorization or product specification.

- GMP is concerned with both production and QC. GMP is aimed primarily at managing and minimizing the risks inherent in pharmaceutical manufacture to ensure the quality, safety and efficacy of products.

Good manufacturing practices (GMP)

- **UNDER GMP:**
- All manufacturing processes are clearly defined, systematically reviewed for associated risks in the light of scientific knowledge and experience, and shown to be capable of consistently manufacturing pharmaceutical products of the required quality that comply with their specifications.

- Qualification and validation are performed.

Good manufacturing practices (GMP)

- All necessary resources are provided, including: sufficient and appropriately qualified and trained personnel, adequate premises and space, suitable equipment and services, appropriate materials, containers and labels, approved procedures and instructions, suitable storage and transport, adequate personnel, laboratories and equipment for in- process controls.
- Instructions and procedures are written in clear and unambiguous language, specifically applicable to the facilities provided.
- Procedures are carried out correctly and personnel are trained to do so.

Good manufacturing practices (GMP)

- Records covering manufacture and distribution, which enable the complete history of a batch to be traced, are retained in a comprehensible and accessible form.
- The proper storage and distribution of the products minimizes any risk to their quality and takes account of good distribution practices (GDP).
- A system is available to recall any batch of product from sale or supply.

Good manufacturing practices (GMP)

- Complaints about marketed products are examined, the causes of quality defects investigated and appropriate measures taken in respect of the defective products to prevent recurrence.

Good manufacturing practices (GMP)

- **Lists of important documents in GMP:**
- Policies
- Standard operating procedures SOP
- Specifications
- Master formula records MFR
- Batch manufacturing record BMR
- Manuals
- Master plans/Files
- Validation protocols
- Forms and formats
- Records

Thank you..

ICH (GUIDELINES)

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1. ICH GUIDELINES

- ICH is the “International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use”.
- ICH is a joint initiative involving both regulators and research-based industry representatives of the EU (Europian union), Japan and the US in scientific and technical discussions of the testing procedures required to assess and ensure the safety, quality and efficacy of medicines.

OBJECTIVES OF ICH

- To increase international harmonization of technical requirements to ensure that safe, effective and high quality medicines are developed.
- To harmonize technical requirements for registration or marketing approval.
- To develop and register pharmaceuticals in the most efficient and cost effective manner.
- To promote public health.
- To prevent unnecessary duplication of clinical trials on humans.
- To minimize the use of animal testing without compromising safety and effectiveness of drug.

ICH LOCATED

- The ICH Secretariat is based in Geneva. The biennial meetings and conferences of the ICH Steering Committee rotate between the EU, Japan, and the USA.

GOAL OF ICH/PURPOSE

- To promote international harmonization by bringing together representatives from the three ICH regions (EU, Japan and USA)
- To discuss and establish common guidelines.
- To make information available on ICH, ICH activities and ICH guidelines to any country or company that requests the information
- To promote a mutual understanding of regional initiatives in order to facilitate harmonization processes related to ICH guidelines regionally and globally
- To strengthen the capacity of drug regulatory authorities and industry to utilize them.

MEMBERS OF ICH

- ICH is comprised of representatives from six parties that represent the regulatory bodies and research-based industry in the European Union, Japan and the USA.
- In Japan, the members are the Ministry of Health, Labour and Welfare (MHLW), and the Japan Pharmaceutical Manufacturers Association (JPMA).
- In Europe, the members are the European Union (EU), and the European Federation of Pharmaceutical Industries and Associations (EFPIA).
- In the USA, the members are the Food and Drug Administration (FDA), and the Pharmaceutical Research and Manufacturers of America (PhRMA).
- Additional members include Observers from the World Health Organization (WHO), European Free Trade Association (EFTA), and Canada. The Observers represent non-ICH countries and regions.

ICH PROCESS OF HARMONIZATION

1) Overview
2) Initiation of ICH Harmonization action
3) Full ICH process for major harmonization topics
4) Abbreviated process for maintenance of ICH agreements
5) Type of maintenance. Updating based on new information

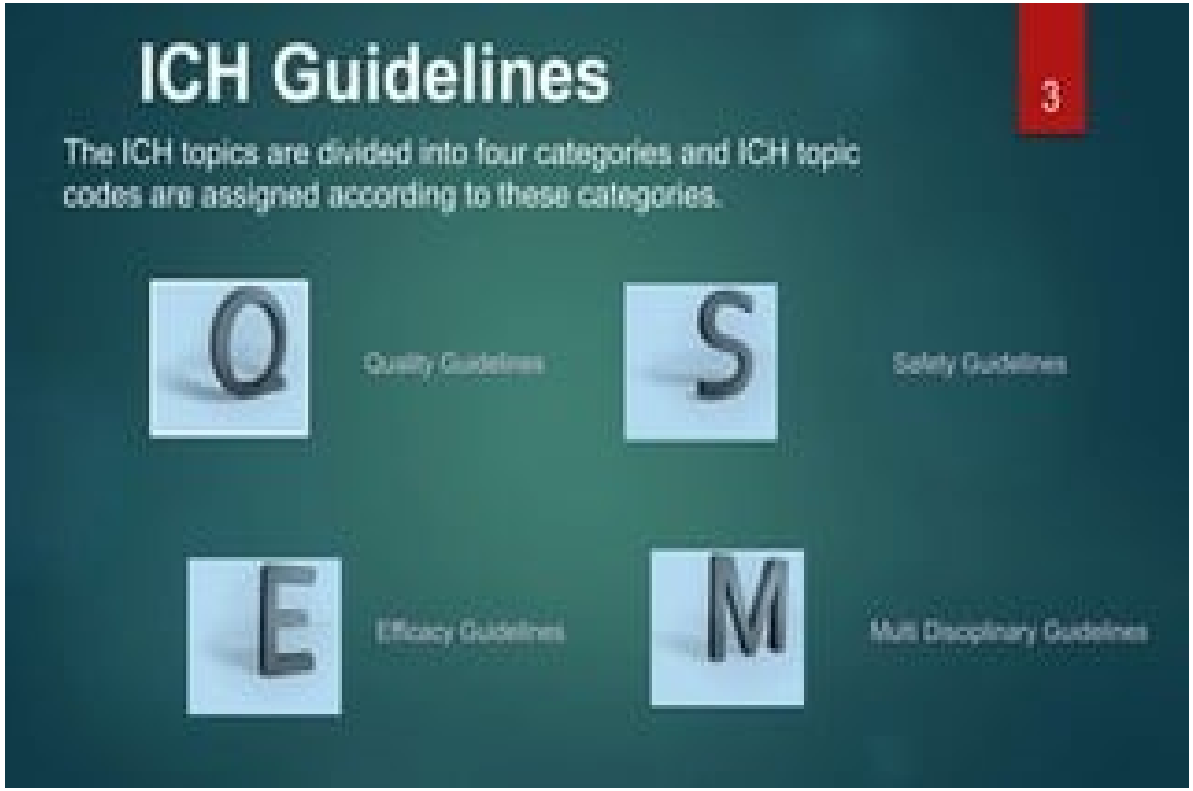
STEPS IN THE ICH PROCESS

- Step-1: Drafts are prepared and circulated through many revisions until a "final harmonised draft" is completed
- Step-2: This draft is signed by the EWG (expert working group) as the agreed-upon draft and forwarded to the Steering Committee for signing which signifies acceptance for consultation by each of the six co-sponsors
- Step-3: The three regulatory sponsors initiate their normal consultation process to receive comments.

STEPS IN THE ICH PROCESS

- Step-4 is reached when the Steering Committee agrees that there is sufficient scientific consensus (agreement) on the technical issues. This endorsement is based on the signatures from the three regulatory parties to ICH affirming that the Guideline is recommended for adoption by the regulatory bodies of the three regions.
- Step-5: The process is complete when the guidelines are incorporated into national or regional internal procedures(implementation in the 3 ICH regions.)

BRIEF OVERVIEW QSEM GUIDELINES



QSEM GUIDELINES

- "Quality" Topics, i.e., those relating to chemical and pharmaceutical Quality Assurance (Stability Testing, Impurity Testing, etc.)
- Efficacy" Topics, i.e., those relating to clinical studies in human subject (Dose Response Studies, Good Clinical Practices, etc.)
- Safety" Topics, i.e., those relating to in vitro and in vivo pre-clinical studies (Carcinogenicity Testing, Genotoxicity Testing, etc.)
- Multidisciplinary" Topics, i.e., cross-cutting Topics which do not fit uniquely into one of the above categories.

QUALITY GUIDELINES

- **Q1A-Q1F---STABILITY:**

  1)Q1A (R2): Stability Testing of New Drug Substances and Products

- The purpose of stability testing is to provide evidence on how the quality of a drug substance or drug product varies with time under the influence of a variety of environmental factors such as temperature, humidity, and light, and to establish a re-test period for the drug substance or a shelf life for the drug product.

  2)Q1B: Photostability Testing of New Drug Substances and Products

  Give guidance on the basic testing protocol required to evaluate the light sensitivity and stability of new drugs and products

QUALITY GUIDELINES

3) Q1C: Stability Testing for New Dosage Forms

Gives guidelines for new formulations of already approved medicines and defines the circumstances under which reduced stability data can be accepted.

4) Q1D: Bracketing and Matrixing Designs for Stability Testing of New Drug Substances and Products

5) Q1E: Evaluation of Stability Data

This guideline addresses the evaluation of stability data that should be submitted in registration applications for new molecular entities and associated drug products.

The guideline provides recommendations on establishing shelf lives for drug substances and drug products intended for storage at or below “room temperature”.

QUALITY GUIDELINES

6) Q1F: Stability Data Package for Registration Applications in Climatic Zones III and IV

Describes harmonised global stability testing requirements in order to facilitate access to medicines by reducing the number of different storage conditions. WHO conducted a survey amongst their member states to find consensus on 30°C/65% RH as the long-term storage conditions for hot-dry and hot-humid regions.

Q2-ANALYTICAL VALIDATION

- Q2(R1): Validation of Analytical Procedures: Text and Methodology
- The objective of validation of an analytical procedure is to demonstrate that it is suitable for its intended purpose
- Gives validation parameters needed for a variety of analytical methods.
- It also discusses the characteristics that must be considered during the validation of the analytical procedures

Q2-ANALYTICAL VALIDATION

- Types of Analytical Procedures to be validated are:
- Identification tests;
- Quantitative tests for impurities content;
- Limit tests for the control of impurities;
- Quantitative tests of the active moiety in samples of drug substance or drug product or other selected components in the drug product.
- Typical validation characteristics of analytical procedures Accuracy, Precision(Repeatability, Intermediate Precision), Specificity, Detection Limit, Quantitation Limit, Linearity, Range.

Q3A- Q3D----IMPURITIES

- Q3A(R2): Impurities in New Drug Substances
- The guideline addresses the chemistry and safety aspects of impurities, including the listing of impurities, threshold limit, identification and quantification.
- Classification of Impurities: are of 3 types
- Organic impurities (process- and drug-related)
- Inorganic impurities
- Residual solvents

Q3A- Q3D----IMPURITIES

- Q3B(R2): Impurities in New Drug Products
- Q3C(R4): Impurities: Guideline for Residual Solvents
- Benzene 2ppm
- Carbon tetrachloride 4ppm
- Dichloromethane 5ppm
- Dichloroethane 8ppm
- Acetonitrile 410ppm
- Chloroform 60ppm
- Chlorobenzene 360ppm
- Formamide,
- Hexane 290ppm
- Toulene 890ppm
- Pyridine 200pm
- Nitromethane 50ppm
- Methanol 3000ppm

Q4: PHARMACOPOEIAS

- Q4A: Pharmacopoeial Harmonisation
- Q4B: Evaluation and Recommendation of Pharmacopoeial Texts for Use in the ICH Regions
- This document describes a process for the evaluation and recommendation given by the Q4B Expert Working Group (EWG) for selecting pharmacopoeial texts to facilitate their recognition by regulatory authorities for use, interchangeable in the ICH regions.

- Q4B Annex 1: Evaluation and Recommendation of Pharmacopoeial Texts for Use in the ICH Regions on Residue on Ignition/Sulphated Ash
- Annex 2:Test for Extractable Volume of Parenteral Preparations
- Annex 3: Test for Particulate Contamination: Sub-Visible Particles
- Annex 4A: Microbiological Examination of Non-Sterile Products: Microbial Enumeration Tests
- Annex 4B: Microbiological Examination of Non-Sterile Products: Tests for Specified Micro-organisms
- Annex 4C: Microbiological Examination of Non-Sterile Products: Acceptance Criteria for Pharmaceutical Preparations and Substances for Pharmaceutical Use
- Annex 5:Disintegration Test
- Annex 6: Uniformity of Dosage Units
- Annex 7: Dissolution Test
- Annex 8: Sterility Test
- Annex 9: Tablet Friability
- Annex 10: Polyacrylamide Gel Electrophoresis
- Annex 11: Capillary Electrophoresis
- Annex 12: Analytical Sieving
- Annex 13: Bulk Density and Tapped Density of Powders
- Annex14 :Bacterial Endotoxins Test 23

Q5A-Q5E---QUALITY OF BIOTECHNOLOGICAL PRODUCTS:

- Q5A(R1): Viral Safety Evaluation of Biotechnology Products Derived from Cell Lines of Human or Animal Origin
- This document is concerned with testing and evaluation of the viral safety of biotechnology products derived from cell lines of human or animal origin (i.e., mammalian, avian(bird), insect)
- The objective is to provide a general framework for virus testing experiments for the evaluation of virus clearance and the design of viral tests and clearance evaluation studies.

Q5A-Q5E---QUALITY OF BIOTECHNOLOGICAL PRODUCTS:

- Three principal, complementary approaches have evolved to control the potential viral contamination of biotechnology products:
- a) selecting and testing cell lines and other raw materials, including media components, for the absence of undesirable viruses which may be infectious and/or pathogenic for humans;
- b) Testing the capacity of the processes to clear infectious viruses;
- c) testing the product at appropriate steps for absence of contaminating infectious viruses.

Q5B: QUALITY OF BIOTECHNOLOGICAL PRODUCTS :

- Analysis of the Expression Construct in Cells Used for Production of r-DNA Derived Protein Products
- This document presents guidance regarding the characterization of the expression construct for the production of recombinant DNA protein products in eukaryotic and prokaryotic cells.
- expression construct should be analysed using nucleic acid techniques

Q5C: QUALITY OF BIOTECHNOLOGICAL PRODUCTS :

- Stability Testing of Biotechnological/Biological Products
- Q5D: Derivation and Characterisation of Cell Substrates Used for Production of Biotechnological/Biological Products
- The objective of this guideline is to provide broad guidance on appropriate standards for cell substrates.

BIOTECHNOLOGICAL/ BIOLOGICAL PRODUCTS SUBJECT TO CHANGES IN THEIR MANUFACTURING PROCESS

- The objective of this document is to provide principles for assessing the comparability of biotechnological/ biological products before and after changes are made in the manufacturing process for the drug substance or drug product.
- Therefore, this guideline is intended to assist in the collection of relevant technical information which serves as evidence that the manufacturing process changes will not have an adverse impact on the quality, safety and efficacy of the drug product.

Q6 : SPECIFICATIONS FOR NEW DRUG SUBSTANCES AND PRODUCTS

- Bulk drug substance and final product specifications are key parts of the core documentation for world-wide product license applications.
- This leads to conflicting standards for the same product, increased expenses and opportunities for error as well as a potential cause for interruption of product supply.

Q6A: SPECIFICATIONS :

- Test Procedures and Acceptance Criteria for New Drug Substances and New Drug Products : Chemical Substances
- The main objective of this guideline is to establish a single set of global specifications for new drug substances and new drug products.
- A specification is defined as a list of tests, references to analytical procedures, and appropriate acceptance criteria, which are numerical limits, ranges
- This guideline addresses specifications, i.e., those tests, procedures, and acceptance criteria which play a major role in assuring the quality of the new drug substance and new drug product during shelf life.

Total Quality Management

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Contents

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- Objectives and Principles of TQM
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- Conclusion

Introduction

- **Total -** made up of the whole
- **Quality -** degree of excellence a product or service provides
- **Management -** act, art or manner of planning, controlling, directing etc.
- **Definition:**

  Art of managing the whole to achieve excellence **OR**

  An integrated organizational effort designed to improve quality at every level **OR**

  The process to produce a perfect product by a series of measures require an organized effort by the entire company to prevent or eliminate errors at every stage in production is called total quality management

Introduction

- TQM increases the customer satisfaction by boosting the quality.
- It does by motivating the work force and improving the way the company operates.
- In an increasing competitive market firms with a continuous improvement culture and external focus are more likely to survive and prosper.
- TQM is consider an important catalyst in this context

The three aspects of TQM

- Based on TRIPLE 'C' concept
- **A. Counting:-Tools, techniques, and training in their use for** analyzing, understanding, and solving quality problems.
- **B. Customers- Quality for the customer as a driving force and** central concern
- **C. Culture- Shared values and beliefs, expressed by leaders that** define and support quality**.**

What is TQM?

- TQM is an approach to improving the effectiveness and flexibilities of business as a whole.
- It is essentially a way of organizing and involving the whole organization every department, every activity and every single person at every level.
- TQM ensures that the management adopts a strategic overview of the quality and focuses on prevention rather than inspection.

Objectives

- To provide high quality drug product to patients
- Process improvement
- Defects prevention
- Helping teams to make better decisions
- Continuous improvement to process systems, people suppliers, partners, products and services

Principles of TQM

- Management commitment
- Employee empowerment
- Fact based decision making
- Continuous improvement

Elements of TQM

- Be customer focused
- Do it right the first time
- Constantly improve
- Quality is an attitude
- Telling staff what is going on
- Educate and train people
- Measure the work
- Top management must be involved
- Make it a good place work
- Introduce the team work
- Organize by process , not by function

Reasons of TQM failure

- Top management sees no reasons for change
- Top management is not concerned for its staff
- Top management is not committed to the TQM programmer
- The company loses interest in the programmer after six months
- The work force and the management do not agree on what needs to happen
- Urgent problem intervene

Benefits of TQM

- Improvement of quality
- Employee participation
- Team work
- Working relationship
- Customer satisfaction
- Employee satisfaction
- Productivity
- Communication
- Profitability
- Market share

Advantages of TQM

- Improves reputation :faults and problems are spotted and sorted quicker.
- Higher employee morale : workers motivated by extra responsibility , team work and involvement in decision of total quality management.
- Lower cost.
- Decrease waste as fewer defective products and no need for separate.

Disadvantages of TQM

- Initial introduction cost .
- Benefits may not be seen for several years .
- Workers may be resistant to change.
- It can be lead to too much attention.
- Extremely demanding of management and staff.
- It is not a quick fix. TQM takes to implement

Philosophies of TQM

1. Walter A. Shewhart
2. W. Edwards Deming
3. Joseph M. Juran
4. Armand V. Feigenbaum
5. Philip B. Crosby
6. Kaoru Ishikawa
7. Genichi Taguchi

Dr. Edwards Deming (Father of Quality)

- American engineer, physicist, multi-awarded statistician and management consultant.
- Introduced Statistical Quality Control into industrial operations
- Through his ideas, product quality improved resulting to popular costumer satisfaction
- Contributed directly to Japan's phenomenal growth and its current technological leadership in automobiles, shipbuilding and electronics.

DR. JOSEPH JURAN

- Introduced the management dimensions of planning, organizing, and controlling and focused on the responsibility of management to achieve quality and the need for setting goals.
- Defines quality as fitness for use in terms of design, conformance, availability, safety, and field use customer-oriented
- Relies on systems and problem-solving techniques.
- Unlike Deming, he focuses on top-down management and technical methods rather than worker pride and satisfaction.

PHILIP CROSBY

- Philip Crosby is an internationally known Quality Expert.
- He is the best known popularizing the “zero the facts” concept that originate in united states at Martin Marietta where Philip Crosby Worked in 1960s.
- He begins his engineering as junior technician in quality authority.
- In 1979 a book Quality is free was published.

Conclusion

- Total quality management encourages participation amongst ,employees ,managers ,and organizations whole.
- The responsibilities either its professional, social , legal, one that the rest with the pharmaceutical manufacturing for the assurance of quality.
- Control should be practiced rigorously.
- The firms which want to implement TQM effectively must have a patience .
- If you change from bad process to good process ,you are sure to get good results and improvement

Thank you…