PROJECT VALIDATION PLAN

FOR

QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

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1.0 APPROVAL SIGNATURES:

This document is prepared by the validation team of …….. for the project "Oral Solid Dosage Formulation Facility" of ……. under the authority of their Project Manager. Hence this document before being effective shall be approved by the Head QA of ……..

PREPARED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		

CHECKED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		
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NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Head -Quality Assurance		

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

2.0 SCOPE AND PURPOSE:

2.1 Scope:

This Project Validation Plan (PVP) is prepared to describe the qualification/ validation requirements and plan for:

- Instruments to be used at the Quality Control Laboratory
- Room and other facilities at Quality Control Laboratory
- Validation of analytical methods

The boundaries of equipments, utilities and buildings are described by the following documents:

- Quality Control Laboratory Layout **(Refer Annex 1)**
- List of Equipments/instruments **(Refer Annex 2)**

The scope and extent of equipment qualification is given in the impact assessment document **(Refer Annex 3).**

All qualification process and approach shall follow the direction and guidelines of the Validation Master Plan (Document number: ……).

2.2 Purpose:

Project Validation Plan (PVP) serves to specify and to co-ordinate all qualification / validation activities required at the quality control laboratory.

PVP program will serve to ensure that all the instruments and systems, including computerized systems at quality control laboratory and the analytical test methods, which may have impact on the analysis result of input and output material quality parameter, are qualified/ validated as per cGLP requirements.

The PVP is subordinated to the Validation Master Plan (VMP) of ……. As during master planning timelines of all activities is not finalized, the concept of the project planning gives a specific activity profile with accurate time planning and resources.

3.0 PROJECT DESCRIPTION:

The salient features and main design characteristics of the quality control facility are as follows:

3.1 Facility Layout:

Title	Drawing No.
Layout of Hormone Block – Mezzanine Floor	…….

3.2 Regulatory compliance:

The facility shall comply with the regulations / guidelines outlined by regulatory agencies such as EU GMP, WHO Geneva & Schedule M etc.

3.3 Material and Personnel flow:

The flow of personnel & materials (components, containers, labels, in-process materials and finished products) through the building are designed in a way to prevent and control contamination and cross contamination between the different samples to be analyzed resulting to faulty analysis result.

The flow of personnel and material transfer for the facility is shown in enclosed layouts in **Annexure 1.**

3.4 Area segregation concept:

Area shall have clear and logical segregation based on the type of testing to be performed, complying cGLP regulations.

Based on the exposure level, area shall be segregated into different hygiene zones with different access routes. Areas with different hygiene zones are separated with air locks to avoid any cross contamination.

3.5 Area Classification:

The entire area of the Quality Control Laboratory is classified into various hygiene classes as per the regulatory requirements.

Hygiene Zone	Operation
Grade A	• Under LAF • Bio Safety Cabinet
Grade B	• MLT-2 • MLT Passage • Air Lock -3 and Exit • Culture Handling Lab
Grade C	• Air Lock -2
Grade D	• Media preparation and Air Lock -1
CNC **(Controlled Not Classified)**	• 2.0 m wide corridor passage • Office • Media and glassware store • Washing area • Media destruction • Sample transfer passage • Incubator room • Instrument Lab 2 • Instrument lab 1 • Balance room • PM lab • Change room 1
UN/C **(Un -Classified)**	• Wash area • Glassware store • GC room • Fume hood • Chemical Store • Wet lab

Filtration level:

Grade B: Pre filter (EU5) followed by fine filter (EU8) and HEPA filter (H14) at AHU terminal.

Grade C: Pre filter (EU5) followed by fine filter (EU8) and HEPA filter (H14) at AHU terminal

Grade D (at rest): Pre filter (EU5) followed by fine filter (EU8) and HEPA filter (H14) at AHU terminal

CNC: Pre filter (EU5) followed by fine filter (EU8).

Filter efficiency:

- Pre filter (EU5) : 99% down to 5 micron
- Fine filter (EU 8) : 95% down to 1 micron
- HEPA filter (H14) : 99.995% (at 0.3 micron) – efficiency

3.6 Instruments:

Major instruments include:

- FTIR
- HPLC
- Dissolution Apparatus
- UV
- TOC analyzer
- Polarimeter
- Steam Heat Sterilizer
- Vertical Autoclave
- Incubators
- Laminar Air Flow
- Bio safety cabinet
- Stability Chamber
- Analytical Balance
- Cooling Chamber

A detailed equipment list is given in **Annexure 02**

3.7 Description of Critical support systems:

Critical Support systems are identified as process utilities for the quality control laboratory. The process utilities are as follows:

- Purified Water.
- Heating Ventilation and Air conditioning system (HVAC)
- Compressed Air

3.8 Purified Water:

The purified water as per the official USP/ EP monograph is obtained from water complying with the potable water specifications as per US EPA or comparable regulation.

The storage and distribution shall be capable of storing and distributing the desired quantity and quality of purified water to the different user points.

Purified water used shall comply with the following parameters:

Parameter	Limit
Appearance	A clear, colourless, odorless and tasteless liquid.
Conductivity at 25°C	Not more than 1.3 µS per cm @ 25°C
pH	5-7
Nitrates	Not more than 0.2 ppm
Heavy metals	Not more than 0.1 ppm
Total Organic Carbon	Not more than 500 ppb
Microbial counts	NMT 100 CFU/ml, determined by membrane filtration method with sample size as per the expected no. of organisms.

3.9 HVAC System:

To meet the following clean room requirement to satisfy the testing, GLP and cGMP requirement as mentioned below.

S.No.	Process Room	Hygiene Class/ Level	Temp.	RH	No. of Air changes
QC Block					
	Air Lock -1	Grade D	NMT 25^0 C	NMT 55 %	20 / Hr
	Air Lock -2	Grade C			40/ Hr
	Air Lock -3	Grade B			60/ Hr
	Exit	Grade B			60/ Hr
	MLT Passage	Grade B			60-90/ Hr
	MLT-2	Grade B			60-90/ Hr
	Culture Handling Lab	Grade B			60-90/ Hr

	Media Preparation	Grade D			20/ Hr
	• 2.0 m wide corridor passage (stability room) • Office • Media and glassware store • Washing area • Media destruction • Sample transfer passage • Incubator room • Instrument Lab 2 • Instrument lab 1 • Balance room • PM lab • Change room 1	CNC	NMT 25^0 C	NMT 55 %	20 / Hr
	• Wash area • Glassware store • GC room • Fume hood • Chemical Store • Wet lab	UN/C	NMT 25^0 C	NMT 55 %	NA

➢ **AHU Operation & Design feature:**

HVAC system shall be provided for the supply of filtered and controlled air to the facility. Separate air handling units shall be provided for the micro lab area. HVAC system catering to the Facility shall have following salient features:

- Dedicated Double skin AHU (Air Handling Unit) with thermal break profile.
- AHUs will have separate supply air and return air backward curved plug fans in grade D, C & B area.
- Cooling coil is provided to offset the outdoor air heat and for necessary dehumidification required.
- Hot water coil is provided for winter heating & monsoon reheating.
- Fresh air is filtered through G4 filter, followed by EU-5 & EU-8. Fine filters are installed in AHU to reduce the particle load on final (H14) HEPA filters.
- The return air is picked up through return air raisers with low level pick-up to provide vertical airflow pattern.

4.0 LABORATORY EQUIPMENT QUALIFICATION APPROACH:

This project validation plan is originated based on the guidance & instruction of VMP (Doc no.: ……). The qualification approach described in VMP shall be followed in qualification of the facility within the stated boundary of the plan.

4.1 Fundamentals:

Different approach shall be adopted for standard laboratory test equipment based on USP.

Generally, most of the laboratory test equipments are available Off the Shelf (OTS).
These OTS instruments and equipment vary from simple to complex automated instruments. Therefore, applying a single set of principles to qualifying such dissimilar instruments would be scientifically inappropriate. Users are most capable of establishing the level of qualification needed for an instrument. On the basis of the level needed instruments shall be categorized into three groups: A, B, and C, as defined below. Examples of instruments in each group are provided. Note that the list of instruments provided here is for illustration only and is not meant to be exhaustive. That category should be determined by users for their specific instruments or applications.

The exact grouping of an instrument must be determined by users for their specific requirements.

Group A

Group A includes standard equipment with no measurement capability or usual requirement for calibration, where the manufacturer's specification of basic functionality is accepted as user requirements. Conformance of Group A equipment with user requirements shall be verified and documented through visual observation of its operation. Examples of equipment in this group are nitrogen evaporators, magnetic stirrers, vortex mixers, and centrifuges.

Group B

Group B includes standard equipment and instruments providing measured values as well as equipment controlling physical parameters (such as temperature, pressure, or flow) that need calibration, where the user requirements are typically the same as the manufacturer's specification of functionality and operational limits. Conformance of Group B instruments or equipment to user requirements is determined according to the standard operating procedures for the instrument or equipment. Examples of instruments in this group are balances, melting point apparatus, light microscopes, pH meters, variable pipettes, refractometers, thermometers and titrators.

Group C

Group C includes instruments and computerized analytical systems, where user requirements for functionality, operational, and performance limits are specific for the analytical application. Conformance of Group C instruments to user requirements is determined by specific function tests and performance tests. Installing these instruments can be a complicated undertaking and may require the assistance of specialists (generally engineer from vendor). A full qualification process shall apply to these instruments. Examples of instruments in this group include the following:

- UV Spectrophotometer
- High-pressure liquid chromatographs
- FTIR spectrometers
- TOC analyzer

The OTS equipment shall not require any design qualification. Because of a delicate and complex nature of the equipment, it is also preferable to carry out the qualification testing by the supplier engineer as per their

own protocol. Therefore, for those test instruments a detailed protocol need not to be prepared. However, protocol and report prepared by vendor shall be approved by QA department of …….

4.2 URS/ Data Sheet Compliance:

URS/ Data Sheet compliance is a documented verification that the system/ equipment/ instrument is supplied as per the specifications mentioned in the URS/ Data Sheet. URS compliance shall be carried out for all off the shelf equipments/ instruments.

4.3 Design qualification (DQ):

Design Qualification (DQ) is the formal and systematic verification that the design of the systems / equipment/instrument is in compliance with the URS & cGLP requirements. The compliance of the design with cGLP shall be demonstrated and documented. The DQ shall be carried out for the customised system/ equipments/ instruments.

Annexure 5 of this PVP (Refer Annexure 07 of PVP – Production) contains a DQ document template.

4.4 Enhanced Design Review (EDR):

Enhanced design review of any equipment shall be conducted in case the equipment is already in use in the same or other facility and need relocation for any other specific project. The GMP risk analysis shall be carried out on the equipment based on the process and product requirement of the specific project. The design measures identified in the risk analysis shall be listed and verified against the actual equipment or its associated documentation. This verification is recorded.

An EDR file shall be containing the review report, risk analysis report and associated documentation including the history of the equipment.

Annexure 8 of this PVP (Refer Annexure 10 of PVP – Production) contains an EDR protocol template.

4.5 Installation Qualification (IQ):

Installation Qualification (IQ) is the documented verification that systems / equipment/ instruments are installed according to the related design documents and the instructions of the equipment suppliers.

4.6 Contents of IQ:

The IQ represents the status of the equipment/system/instrument where the completeness and correctness of all required documents is checked (e.g. technical drawings, P&IDs, calibration certificates, material certificates, manuals, logbooks, work instructions, etc.).

The IQ protocols will be prepared with regard to the approved VMP, PVP and DQ documents and supplier information.

Installation qualification test plan includes following verifications:

i) Verification of documents and drawings: Documents and drawings shall be applicable to the instrument/ equipment or system. A general list of required cGLP relevant document is listed in the Data sheet 2 of template IQ protocol. This test shall verify the availability of the required document and it's "as built status".

ii) Verification of components: Components which are relevant to GLP and EHS shall undergo verification. This test verify compliance of the component with respect to its identification, its compliance with the

approved specification of parameters that are related to IQ, absence of damage and its clean room suitability, if required.

iii) Verification of Installation: This test verifies the overall installation of the instrument/ equipment or system with respect to its identification, compliance with approved drawing, general cleanliness, levelling, connection with utilities etc.

iv) Identification of Standard Operating Procedure: shall be listed and verified that they are identified.

The actual contents of an IQ depend on the purpose and complexity of the equipment / system which has to be qualified. Change applications which have been raised after DQ approval have to be taken into account also.

4.7 General acceptance criteria for IQ:

General acceptance criteria for the IQ tests are listed below. Specific acceptance criteria which belong to individual test procedures are listed in the actual qualification documents.

- Systems / equipment/ instrument parts are installed according to design documents and supplier documentation.
- Critical parameters of system/equipment/ instrument parts, like model/type, material, surfaces, etc., correspond to approved design documents and supplier documentation
- Systems/equipment parts are correctly installed and undamaged (visual check)
- Systems/equipment / instrument parts are labelled correctly
- Documents listed in the IQ-protocol are available

It is allowed to refer to FAT (if carried out) and other test results in case it is ensured that systems/equipment parts have not been changed or damaged after test performance and that the test results are appropriately recorded and documented.

4.8 General IQ procedure:

Responsibilities for preparation, review and approval of IQ-protocols are identified in the **Annex 4** of this PVP.

Annex 6 of this PVP (Refer Annexure 8 of PVP- Production) contains an IQ-protocol template. Details about preparation and execution of Qualification protocols are given in section 6.0.

Before IQ execution of a system / equipment, the following preconditions must be fulfilled:

- DQ-report must be approved.
- IQ-protocol must be approved.
- Installation of the system / equipment has to be completed
- Relevant technical documentation has to be available (e.g. P&ID, Instrumentation diagram, etc.).
  Remark: For starting IQ, the complete technical system / equipment documentation must be available.
- Pre-conditions defined in PVP and IQ documents have to be fulfilled

During IQ performance the responsible member of the validation team will check whether the acceptance criteria of the tests are fulfilled or not and will certify this and that the tests have been performed in accordance to the approved IQ-protocol by signing the reserved fields in the protocol with date and signature. If the requirements of an individual test were not fulfilled and an acceptance criterion was not met, comment shall be made for the same in comment summary sheet and if required a deviation has to be raised as per SOP.

After IQ has been performed an IQ report format will be filled in where all test results will be summarized as whether the test is complied or not. The filled in / performed IQ protocols will be reviewed and approved. With approval, the filled in IQ-protocols become part of final IQ reports.

The IQ tests which require running / operating special machines or equipment or instrument are performed exclusively by the trained technical staff of the facility or by the trained technical staff of the supplier.

In certain cases, tests can be completed in advance of the formal IQ, for example in case system / equipment/ instrument parts would not be accessible after installation has been completed. To do this the relevant test specifications have to be approved individually by the Validation Manager before execution.

4.9 Operation Qualification (OQ):

Operational Qualification (OQ) is the documented verification that all systems / equipment operate in accordance with the specifications and meet the established requirements / acceptance criteria with respect to the control of the operational parameters throughout representative or anticipated operating ranges.

4.10 Contents of OQ:

The OQ protocols will be prepared with regard to the approved VMP, PVP and DQ documents.

- Generally an OQ contains following three types of test as follows:

a) General OQ checks that include

   a. Verification of IQ reports
   b. Verification of documents
   c. Verification of general functions of the equipments/ instrument/ system as per the equipment operation manual or draft SOP's.

b) Verification of control system (as applicable)

   a. HMI screen verification
   b. Verification of inputs and outputs
   c. Verification of Alarm and interlock testing
   d. User access test
   e. Verification of configurable parameter
   f. Power failure test
   g. Real clock verification
   h. Verification of database backup & restore
   i. Verification of interface and communication/ printer
   j. Verification of event logging and data integrity (as applicable)
   k. Verification of Printer & cycle printouts

c) Specific operational test

   a. Verification of equipment suitability within the operational range of the functional parameter.
   b. Blank run of specific programs / recipes (as applicable)
   c. Verification of specific function of major functional components (as applicable)

d) Verification of training records

The actual contents of an OQ depend on the purpose and complexity of the systems / equipment which have to be qualified. Change applications, which have been raised after DQ approval, have to be taken into account also.

4.11 General acceptance criteria for OQ:

General acceptance criteria for the OQ tests are listed below. Specific acceptance criteria which belong to individual specific test procedures are listed in the actual qualification documents.

- Approved IQ report is available
- Test equipment, incl. display and recording instruments, which are used to supply the required test data, are calibrated (certificate / protocol available).
- SOPs (at least the first draft) for normal / routine operation, monitoring and preventive maintenance are available.
- Automated sequences, i.e. interlocks, alarm systems and timers function in accordance with the approved design.
- Controls do not indicate other operational states than those which are defined in the related programmes.
- Control system can be configured within desired operating ranges.
- Samples, collected from equipment / system have the specified quality (e.g. air, water, etc.; necessary analysis to be performed by ……).
- Only authorised persons have access to systems (user access)
- User management works according to the approved design (user access levels)
- The function of automatic control system must not be affected by any power failure
- Archiving and retrieval works according to the approved design (for Electronic Records only)
- System should work reliably when operated at extreme ranges of operating parameter.

It is allowed to refer to FAT, SAT and other test results in case it is ensured that systems / equipment parts have not been changed or damaged after test performance and that the test results are appropriately recorded and documented.

4.12 General OQ procedure:

Responsibilities for preparation, review and approval of OQ-protocols are identified in the **Annex 4** of this PVP.

Annex 7 of this PVP (Refer Annexure 09 of PVP- Production) contains an OQ protocol template. Details about preparation, structure and execution of Qualification protocols are given in section 6.0.

Before OQ, execution can start for a system / equipment/ instrument the following preconditions must be fulfilled:

- IQ report must be approved
- OQ protocol must be approved
- Instrument/ equipment / system has to be officially released for OQ
- Verification of the calibration of the critical instrument
- Pre-conditions defined in PVP and OQ documents have to be fulfilled

During OQ performance the responsible member of the validation team will check whether the acceptance criteria of the tests are fulfilled or not and will certify this and that the tests have been performed in accordance with the approved OQ-protocol by signing the reserved fields in the protocol with date and signature. If the requirements of an individual test are not fulfilled and an acceptance criterion has not been met, a deviation has to be raised by filling in the deviation sheet. After OQ has been performed, an OQ report format will be filled in where all test results will be summarized as whether the test is complied or not. The filled in / performed

OQ protocols will be reviewed and approved. With approval, the executed OQ-protocols become part of final OQ reports.

The OQ tests which require running / operating special instruments or equipment are performed exclusively by the trained technical staff of the facility or by the trained technical staff of the supplier.

In certain cases, tests can be completed in advance of the formal OQ, for example in case of software functions. To do this the relevant test specifications have to be approved individually by the Validation Manager before execution.

4.13 Performance Qualification (PQ):

The PQ provides the documented evidence that the systems / equipment to be qualified can perform as per the process requirement over an extended period of time.

It demonstrates that the systems / equipment/ instrument can supply the required quality output under normal operating conditions consistently, reliably and repeatedly.

The initial PQ will be the basis for further qualification and validation activities, which have to be performed for future.

4.14 Contents:

The PQ protocols will be prepared with regard to the approved VMP, PVP and DQ documents.

In general, a PQ may contain:

- General test
- Performance test (instrument/ equipment/ system specific)

The actual contents of PQ depend on the purpose and complexity of the instrument/ equipment/ system which has to be qualified.

4.15 General acceptance criteria for PQ:

The general acceptance criteria for the PQ tests are listed below. Specific acceptance criteria which belong to individual test procedures are listed in the actual qualification documents.

1. The system must operate within the specifications consistently, reliably and repeatedly for a longer period of time.
2. Samples must meet the predefined specifications.
3. The test results of all the samples subjected for the PQ testing must be identical within the specified limit.

4.16 General PQ procedure:

The PQ (preparation, performance, documentation, handling of deviations, etc.) is carried out in the same way as the OQ. Responsibilities for preparation, review and approval of PQ protocols are identified in the VMP.

Before PQ execution can start for a system / equipment the following preconditions must be fulfilled:

- OQ-report must be approved
- PQ-protocol must be approved
- Systems / equipment have to be officially released for PQ
- Approved SOPs have to be available
- Pre-conditions defined in VMP, PVP and PQ documents have to be fulfilled.

After PQ has been performed, an PQ report will be prepared in where all test results will be summarized as whether the test is complied or not. The filled in / performed PQ protocols will be reviewed and approved. With approval, the executed OQ-protocols become part of final OQ reports.

Performance qualification protocol and report shall be specific to equipment/ system therefore no standard template format prepared.

Although PQ is described as a separate activity, it may in some cases be appropriate to perform PQ tests in conjunction with OQ and not prepare separate PQ documents.

4.17 Computerised Systems:

Computerised systems which are used in the testing of pharmaceutical products and which may have a direct or indirect influence on product quality and patient safety are GLP relevant systems, hence GLP critical.

GxP critical systems have to be designed with regard to the principles of Good manufacturing practice (GMP) and Good Laboratory Practices (GLP) Therefore, it has to be ensured that GLP relevant externally produced computerised systems (hardware and software) are compliant with GAMP 5 and 21 CFR part 11 (as applicable).

The computerised systems of this project are all process-related function units which operate autonomously within a defined application range. The function units have their own control units and are integrated via a small number of interfaces. Therefore, the function units can be called Package Units. According to this, an integrated computer validation concept is chosen. This means, that computer validation aspects are an integral part of instrument/ systems / equipment qualification (e.g. DQ, IQ, OQ), FAT and SAT. Consequently the Impact Assessment includes also the computerised systems and identifies the GLP-GLP critical systems, regarding their influence on product quality and patient safety.

Consistent with the integrated computer validation concept, the required software functions checks will be performed as “Black-Box” tests.

To define a validation strategy and to define the extent of required computer validation activities for software and hardware of the GLP critical systems, Supplier Assessments and Software and Hardware Categorisations have to be performed in accordance to the requirements of GAMP 5. Assessment for 21part 11 for Electronic Records & Electronic Signature have also to be performed.

4.18 Supplier Assessment:

It is necessary to ensure that GLP relevant externally produced systems (hard- and software) have a required quality. Therefore, a supplier assessment will be performed in order to check the quality standard of a company and its products. The quality of the software is of special importance because it determines the function of the system or influences the process decisively.

This assessment can be carried out in the form of:

- Supplier audits
- Supplier self-information according to a standardised questionnaire
- Other assessment tools

The results of the supplier assessment will be used as a basis to determine a suitable computer validation strategy for each single system. This will be documented in the final report of the supplier assessment.

4.19 Supplier audits:

Supplier audits are usually only performed to examine the suppliers of process key equipment or of computerised systems which are partly or completely developed for the customer. The audit will be performed at the supplier. Therefore, the standardised questionnaire is used. The auditor is not reduced to this

questionnaire. According to the results and his experience he is able to check several points in more or less detail.

The questionnaire is sent to the supplier before the audit takes place that he is prepared for the performance.

4.20 Supplier self-information:

Supplier self-information is usually used to verify the supplier's qualification for delivering standard systems. Therefore, a standardised questionnaire is sent to the supplier, which he has to fill in and send back. The results will be assessed.

4.21 Other assessment tools:

As an alternative to the supplier self-information other assessment tools can be used to verify the supplier's qualification for delivering standard system. This can be for example experience reports, approved supplier according to data base of quality management system, audit results from other projects, etc.

4.22 Software and Hardware Categorization:

Software and Hardware Categorisation will be performed according to GAMP 5, Appendix M4, which differentiates between the hardware categories "Standard Hardware Components", and "Custom Built (Bespoke) Hardware Components" and software categories "Operating system", "Firmware", "Standard Software Packages", "Configurable Software Packages" and "custom (bespoke) Software".

4.23 Hardware Categories (according to GAMP 5, Appendix M4):

4.24 Hardware Category 1: Standard Hardware Components:

Standard hardware components should be documented including manufacturer or supplier details, and version numbers. Hardware Acceptance or IQ should verify installation and connection of components. The model, version number and, where available, serial number, of pre-assembled hardware should be recorded. Pre-assembled hardware that is sealed does not have to be disassembled if this breaks warranty. In such cases the hardware details can be taken from the hardware's data sheet or other specification material. Configuration Management and Change Control apply.

4.25 Hardware Category 2: Custom Built (Bespoke) Hardware Components:

These requirements are in addition to those of Hardware Category 1 components. Bespoke items of hardware should have a design specification and be subjected to acceptance testing. A Supplier Audit should be performed for bespoke hardware development. Assembled systems using bespoke hardware from different sources require verification confirming compatibility of interconnected hardware components. Any hardware configuration should be defined in the design documentation and verified in the Installation Qualification. Configuration Management and Change Control apply.

4.26 Software Categories (according to GAMP 5, Appendix M4):

A. Category 1: Infrastructure Software

Infrastructure elements link together to form an Integrated environment for running and supporting applications and services.

There are two types of software in this category:

- **Established or commercially available layered software:** Applications are developed to run under the control of this kind of software. This includes operating systems, database managers, programming

languages, middleware, ladder logic interpreters, statistical programming tools, and spreadsheet packages (but not applications developed using these packages).

- **Infrastructure software tools:** This includes such tools as network monitoring software, batch job scheduling tools, security software, anti-virus and configuration management tools. Risk assessment should, however, become out on tools with potential high impact, such as for password management or security management, to determine whether additional controls are appropriate.

  Layered software is not subject to specific functional verification although their features are functionally tested and challenged indirectly during testing of the application. The identity and version numbers of layered software and operating system should be documented, and verified during installation.

  Infrastructure software tools are generally highly reliable, and significantly removed from any aspect of patient risk. All infrastructure software should be controlled and managed. See the *GAMP Good Practice Guide: IT Infrastructure Control and Compliance* for further guidance (Reference 34, Appendix G3).

B. Category 3: Non – configured Software

This category includes off-the-shelf products used for business purposes. It includes both systems that cannot be configured to conform to business processes and systems that are configurable but for which only the default configuration is used. In both cases, configuration to run in the user's environment is possible and likely (e.g., for printer setup). Judgment based on risk and complexity should determine whether systems used with default configuration only are treated as a Category 3 or Category.

C. Category 4: Configurable Software Packages

Configurable software packages provide standard interfaces and functions that enable configuration of user specific business or manufacturing processes. This involves configuring predefined software modules and possibly developing further bespoke or customised modules. Complex systems often have layers of software, with one system including several software categories. Software packages and the platform should be well known and mature before being considered Category 4 software, otherwise Category 5 may be more appropriate.

A Supplier Assessment is usually required to confirm that the software package has been developed using appropriate quality systems and that application development and support organisations are robust and competent. In the absence of a documented quality system, suppliers should use this guide to provide the foundation for establishing a suitable quality system to control package development and support. Under such circumstances the software should be handled as Category 5. Users are responsible for ensuring the quality of the software and hardware, and the fitness for purpose of the complete system.

Validation should ensure that the software package meets the user requirements with particular focus on the configured business or manufacturing process. Bespoke or customise modules should be handle as Category 5.

A structured approach to the validation of the application covering the full life cycle, including assessment of the supplier and the configurable package should be defined. The approach should address the layers of software involved and their respective categories.

Since each application of the standard product is specific to the user process, support of such systems needs to be carefully managed. For example, when new versions of the software products are introduced, serious issues can arise from the dependency of bespoke or customised code on features of the standard product which may have changed.

Examples of Category 4 packages include Distributed Control Systems (DCS), Supervisory Control and Data Acquisition packages (SCADA), Manufacturing Execution Systems (MES), and some LIMS, ERP, MRPII packages, and PLC based control systems, which are configured according user requirements.

D. Category 5: Custom (Bespoke) Software

These systems are developed to meet the specific needs of the user company. Custom developments may be a complete system or extension to an existing system. Complex systems often have layers of software, with one system including components of several software categories.

A Supplier Audit is usually required to confirm that appropriate quality systems are established to control development and ongoing support of the application. In the absence of a documented quality system, suppliers should use the GAMP to provide the foundation for establishing a suitable quality system to manage application development and support.

A full life cycle approach to the validation of the application should be defined. The approach should address the layers of software involved and their respective categories. The assessment of the supplier and any audit observations, application criticality, size and complexity should be reflected. Strategies for the mitigation of any weaknesses identified in the supplier's development process should be defined.

Examples of Category 5 may include PLC based control systems which are specially developed according user requirements.

The validation approach which follows the single software categories is summarised in the following table:

Category	Software type	Description	Examples	Qualification approach
1	Infrastructure Software	• Layered software (.i.e. upon which applications are built) • Software used to manage the operating environment.	• Operating systems • Database Engines. • Middleware • Programming Language • Statistical packages • Spreadsheets • Network monitoring tools • Scheduling tools • Version control tools	• Record version number, verify correct installation by following approved installation procedures

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

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Category	Software type	Description	Examples	Qualification approach
3	Non configured software	Run-time parameters may be entered and stored, but the software cannot be configured to suit business process.	• Firmware based applications • COTS software • Instrument's software	• Abbreviated life cycle approach. • URS • Record version number, verify correct installation. • Risk-based tests against requirements as dictated by use (for simple systems, regular calibration may substitute for testing). • Procedures in place for maintain compliance and fitness for intended use.
4	Configured software	Software, often very complex that can be configured by the user to meet the specific needs of the user's business process. Software code is not altered.	• LIMS • Data acquisition systems • SCADA • ERP • MRPII • Clinical trial monitoring • DCS • ADR Reporting • CDS • EDMS • BMS • Spreadsheets • Human machine interface	• Life cycle approach • Demonstrate supplier has adequate QMS • Some life cycle documentation retained only by supplier (eg. DS) • Record version no., verify correct installation • Risk-based testing to demonstrate application works as designed within the business process. • Procedure in place for maintaining compliance and fitness for intended use. • Procedures in place for managing data
5	Custom (Bespoke) software	Software custom designed and coded to suit the business process.	Varies, but includes:	Same as for configurable, plus:

Category	Software type	Description	Examples	Qualification approach
			• Internally and externally developed IT applications. • Internally and externally developed process control applications. • Custom ladder logic. • Custom firmware • Spreadsheet (macro)	• More rigorous supplier assessment, with possible supplier audit. • Possession of full life cycle documentation (FS, DS, structural testing etc.) • Software integration testing • Design and source code review.

4.27 21-CFR Part 11-assessment:

To decide if 21 CFR Part 11 has to be applied, it has to be examined if GLP-relevant electronic records or electronic signatures are created within the computerised system. In this case 21 CFR Part 11 has to be applied and the compliance of the computerised system with the requirements of 21 CFR Part 11 has to be verified.

5.0 SOP'S:

SOPs identified at each qualification stage shall be verified.

6.0 PREPARATION AND EXECUTION OF QUALIFICATION DOCUMENTS:

Preparation, structure and execution of qualification documents should be performed according to the instructions given below and in the related qualification documents.

The instructions given below are related to the Qualification Document Templates of **Annex 5, 6, 7 and 8 (Refer annexure 7, 8, 9 & 10 of PVP – Production)** of this document.

6.1 Preparation and structure of qualification protocols and reports (DQ / IQ / OQ)

The Qualification protocols and reports are made up of a number of basic qualification document requirements and of a number of specific tests. The Qualification Documents are subdivided into a main document and a number of annexes.

The main document contains the following section:

1. Approval signatures
2. Objective
3. Scope
4. Reference document
5. Equipment / system / facility description
6. Test plan
7. Responsibility
8. Test Execution procedure/method
    a. Prerequisites

b. Signature registration and training
c. General recording instruction
d. Deviation handling procedure
e. General safety instruction for execution (applicable for IQ/ OQ/PQ)

9. Acceptance criteria
10. Summary report and conclusion
11. List of Annexures / test data sheets

Approval Signatures: This section should list the name and department of authorised personnel who would be responsible for writing the protocol followed by reviewing and approving the document for execution. All the listed personnel should sign against their names.

Objective: It is the statement which describes the target of the protocol

Scope: This section should identify the equipment or instrument or system for which qualification is to be done. Also this section shall state that this protocol is for initial qualification or whether it or any portion of it can be used in case of re-qualification.

Reference Document: In this section of the qualification documents a list of document is given in which critical requirements to be checked are specified. Therefore, these documents shall be the basis of the acceptance criteria.

Equipment/ Instrument/ System Description: This section should describe use, capacity and operational and design feature.

Test plan: The test plan depends on the qualification step and equipment. A generic description for test plan for DQ, IQ and OQ is given in the preceding sections.

Responsibility: This section should identify the general and critical activities including the name of team responsible for completing qualification activity, starting from preparation of protocol to approval of report.

Test Execution procedure: Though test methodology shall be written in the test data sheets, this section gives general procedure for test execution which are written in the proceeding section for qualification execution method.

Acceptance Criteria: This section gives the requirement to pass the test as "The individual parameters successfully pass the examination if all responses in the test sheets in the inspection result column are "Y" or those tests with an open response (i.e. because a check was not feasible) are justified, and acceptance of the justification must be recorded by the approvers of the report."

Summary report and conclusion: This section gives guidance to preparing the report of protocol and to close the individual phase of the qualification.

List of annexures/test data sheets: Based on the test plan test execution data sheets are prepared and enclosed as test sheet.

It is possible that the reference documents, which have been used for protocol generation, are changed after an IQ/OQ protocol has been written and before IQ/OQ execution. The change of the reference documents will be handled according to the project internal Change Control procedure given in the proceeding section. The influence of document changes on the IQ/OQ protocol will be covered via a separate IQ/ OQ test.

6.2 Execution and documentation of tests:

6.3 General Recording Instruction:

- Execution will be carried out as per the SOP for Qualification protocol execution. (SOP).
- Recording of observation will follow good documentation practice as per SOP.
- In the test data sheet test parameter and criteria will be pre-defined. Other cells e.g. observation and signature will be completed manually by the person.
- Where observation is to be recorded as 'Y/N/NA', write 'Y' when the observation is in compliance with acceptance criteria, write 'N' when observation is a non-compliance. If it is not applicable write NA, if unobvious write suitable justification for being not applicable.
- Any mistake in the approved protocol format if identified before or during execution shall be recorded as comment rather cancelling it manually. This mistake will be verified during review of executed protocol.
- Comment summary sheet will be available separately as Data sheet. This test sheet should be separate for a specific test sheet. Required number of comment summary sheet shall be issued during execution.
- Comments and deviation will be recorded as per the instruction given in the following section.

6.4 Deviation Handling:

- During execution the comments if any shall be noted in the respective datasheet.
- All comments shall be numbered as "X-YY" where "X" is test sheet no. and "YY" is the sequential serial no. for that particular test sheet; For example in test sheet no. 3, second comment shall be numbered as 3-02. Comment number shall be allotted on the test data sheet and comments shall be written on comment summary sheet.
- During review or execution all comments shall be verified and if any comment is made to specify non-compliance to that test acceptance criteria, comment shall be escalated as "Deviation"
- The deviation will be identified and it will be suitably numbered in the comment section of the comment summary sheet as per SOP.
- The deviation will be assessed whether it has any GLP criticality. GLP non-critical deviations can be justified whereas GLP critical deviation may require investigation and corrective actions. Appropriate justification, investigation, corrective action and verification of effectiveness of corrective action will be recorded in the deviation sheet.
- Analyze the deviations of installation and operational qualification test whether they can affect the Operational or Performance qualification test, respectively or not. If not, next qualification stage can be initiated before the deviations are resolved. The deviations, which are not resolved, will be listed as "Action List". The action list should be the part of IQ / OQ report, however all deviations will be resolved before handing over the equipment for routine use.

6.5 General Safety Instruction for Execution:

Safety will be one of the key considerations during the execution of this protocol. The following guidelines must be observed during the execution stage.

- All personnel involved with the execution shall identify hazards associated with performance of qualification testing and precautions to be taken.
- All personnel involved with the execution shall inform to company management any hazard, to themselves or others, associated with the materials, equipment, method of working and the precautions to be taken.

- All personnel involved with the execution shall check that utilities are safely isolated when energizing or de-energizing.

7.0 FACILITY QUALIFICATION:

Facility qualification is the verification of compliance of a room with corresponding approved room specification detailed in various document, e.g. room data sheet and associated drawings.

Verification of following design aspects shall be part of facility qualification:

- Verification of room size as per the room data sheet.
- Verification of compliance of finished building with the layout drawing and room data sheet.
- Verification of compliance of wall, floor and ceiling finishes as per the room data sheet.
- Verification of details of doors and windows (location and type)
- Verification of light fixtures, power sockets, switch sockets
- Verification of compliance of room illumination with the room data sheet.
- Verification of equipment location with the availability of space to carry out necessary operations.
- Verification of availability of drains and their type.
- Verification of availability of utility supply during the qualification of the respective utility systems so that rooms are supplied with specified utilities.
- Verification of door interlocking at airlocks/change room to the critical areas.
- Verification of room hygiene conditions during HVAC qualification, at operating condition.
- Verification that all major equipments/ instruments and utility systems required is qualified as per Project Validation Plan.
- Verification of other features such as E. Communication, phone and data link
- Verification of measures identified in risk analysis

The above verifications shall be documented in the room data sheets and drawings. The verified room data sheets and the annotated drawings shall be attached with the protocol.

Upon completion of facility qualification a report shall be prepared to summarise the status, deviations if any and the corrective actions planned.

The contents of the facility qualification protocol shall be:

1. Pre Approval signatures
2. Introduction
3. Objective
4. Scope
5. References
6. Facility description
7. Responsibilities
8. Qualification plan
9. Qualification process
10. Acceptance criteria
11. Deviation handling
12. Summary report and conclusion
13. Abbreviations and definitions
14. List of Annexes / test data sheets

The specimen format of Facility qualification protocol and respective report is enclosed as **Annexure-09** (Refer Annexure 11 of PVP – Production**)** with this PVP.

8.0 QUALIFICATION PROJECT MANAGEMENT CONTROL:

8.1 Qualification Project Plan:

The major qualification/validation activities, under this Project Validation Plan, are considered as a project, which initiates at the verification of design concepts of equipment systems and building and ends at the qualification of them. A project schedule and corresponding responsibility profile is prepared for the effective project management.

8.2 Qualification Project Schedule:

The qualification project schedule shall be prepared before starting the project. This schedule lists each activity of the project and their completion.

8.3 Qualification Responsibility:

As …… is contracted for the validation services, major portion of responsibility of validation will be lying with Validation group of ……..

Following are the responsibilities of ……:

- Preparation of Design Qualification Document
- Preparation of all necessary documents master plan, Validation protocols, reports and summaries.
- Review of all protocols
- Review of qualification data, and summary reports
- Preparation and review of summary reports.

Following are the responsibilities of the …….. Validation team:

- Monitor the progress of the project to ensure completion of validation activities on schedule.
- Execution of all qualification protocols
- Testing of samples for qualification of the instrument/ equipment / systems.
- Ensure supply of all necessary documents required for the qualification from the vendors.
- Review and approval of all protocols and reports.

The validation will be accomplished by a cross functional team involved in this project. The cross functional team include members from consultant staffs, engineering, validation, production, quality control. A detail responsibility profile is given in a matrix attached as **Annex -4.**

8.4 Review of Qualification Project Status:

Project progress will be monitored continuously by project management of ……. and …….. The project schedule will be used as a tool to verify the current status of the project. A monthly report shall be prepared till the completion of the project. Report should contain the following as minimum:

- ❖ Validation activity planned.

- ❖ Validation activity executed and closed.
- ❖ Deviation / changes and its status.
- ❖ Problems encountered in completion of the activities.

8.5 Training:

A proper training program or SOP must be available, that describes the plan for training of the concerned operating, maintenance, quality control and other personnel.

On completion of each validation activity i.e. IQ, OQ, PQ, etc. the validation team should organize a training program for the concerned operating, maintenance, quality control and other personnel. Topics such as the equipment/system specification, configuration, critical process control parameters, operating ranges, process flow, routine operation, safety, cleaning procedure, calibration procedure, maintenance program, documentation, related topics and SOP's emerged out of the validation activities should be covered in the training program. Records of training, evaluation and qualification should be documented and records should be maintained. It might be presented to the regulatory authorities, if required.

9.0 ANALYTICAL METHOD VALIDATION:

9.1 Approach:

The validity of a specific method should be demonstrated in laboratory experiments using samples or standards that are similar to the unknown samples analyzed in the routine. The preparation and execution should follow a validation protocol written in a step-by-step instruction format.

Following analytical methods shall be used in the formulations facility:

⇒ Qualitative and Quantitative analysis by HPLC, TOC, Spectrophotometer etc.

⇒ Microbiological testing

- ▪ Microbial limit test

9.2 Possible steps for a complete method validation:

A. Develop a validation protocol for the validation

B. Define the application, purpose and scope of the method

C. Define the performance parameters and acceptance criteria

D. Define validation experiments

E. Verify relevant performance characteristics of equipment

F. Qualify materials, e.g. standards and reagents

G. Perform pre-validation experiments

H. Adjust method parameters or/and acceptance criteria if necessary perform full internal (and external) validation experiments

I. Develop SOPs for executing the method in the routine

J. Define criteria for revalidation

K. Define type and frequency of system suitability tests and/or analytical quality control (AQC) checks for the routine

L. Document validation experiments and results in the validation report.

- The method's performance characteristics should be based on the intended use of the method. For example, if the method will be used for qualitative trace level analysis, there is no need to test and validate the method's linearity over the full dynamic range of the equipment. Initial parameters should be chosen according to the analyst's best judgment. Finally, parameters should be agreed between the laboratory generating the data and the department using the data.
- Before an instrument is used to validate a method, its performance should be verified by ensuring its qualification status, calibration status and / or performance checks. Satisfactory results for a method can only be obtained with well performing instrument. Special attention should be paid to the instrument characteristics that are critical for the method.
- Reagents and Reference Standards should be checked for accurate composition and purity.
- If there is no or little information on the method's performance characteristics, it is recommended to prove the methods suitability for its intended use in initial experiments. These studies should include the approximate precision, working range and detection limits. If the preliminary validation data appear to be inappropriate, the method, the equipment, the analysis technique or the acceptance limits should be changed.
- During method validation the parameters, acceptance limits and frequency of ongoing system suitability tests or quality control checks should be defined. Criteria should be defined to indicate when the method and system are out of statistical control.
- If standard / official methods are used, it should be verified that the scope of the method and validation data, for example, sample matrix, linearity, range and detection limits comply with the laboratory's analyses requirements; otherwise, the validation of the standard method should be repeated using the laboratory's own criteria. The laboratory should demonstrate the validity of the method in the laboratories environment.
- Full validation of a standard method is recommended where no information on type and results of validation can be found in the standard method documentation.
- Microbiological testing method shall be validated as per the pharmacopoeial method.
- Detailed methods of validation shall be available in the SOPs.

9.3 Matrix:

A suggested matrix for validation of standard analytical procedure is illustrated below:

Types of analytical Procedure		Identification	Testing for Impurities		Assay -Content/potency
			Quantitative Test	Limit Test	
Accuracy		×	✓	×	✓
Precision	Repeatability	×	✓	×	✓
	Intermediate Precision	×	✓(1)	×	✓(1)
Specificity (2)		✓	✓	✓	✓
Detection Limit		×	×(3)	✓	×
Quantitation Limit		×	✓	×	×
Linearity		×	✓	×	✓
Range		×	✓	×	✓

× Signifies that this characteristic is not normally evaluated.

✓ Signifies that this characteristic is normally evaluated.

1 in case where reproducibility has been performed, intermediate precision is not needed

2 lack of specificity of one analytical procedure could be compensated by other supporting analytical procedure (s)

3 may be needed in some cases

9.4 Validation Schedule:

A detailed working plan shall be prepared to include all the activities necessary to perform the analytical method validation study, the time for completion of each activity, as well as responsibilities.

9.5 Training:

A proper training program or SOP must be available, that describes the plan for training of the concerned personnel.

On completion of each validation activity the validation team should organize a training program for the concerned personnel. Records of training and evaluation shall be documented and records should be maintained.

9.6 Preparation and structure of qualification protocols and reports:

The Analytical Method Validation protocols and reports are made up of a number of basic validation document requirements and a number of specific tests. The validation document is subdivided into a main document and a number of annexes.

The protocol contains the following section:

1. Approval signatures
2. Objective
3. Scope
4. Pre Requisites
5. References
6. Responsibility
7. Method description
8. Validation Test plan/ Matrix
9. Test Execution procedure
10. Acceptance criteria
11. Summary report and conclusion
12. List of Annexes / test data sheets

10.0 PROJECT CHANGE MANAGEMENT:

A project internal change control procedure has been implemented to, inform, evaluate, approve or reject and follow up planned changes to equipment, systems, instruments and rooms. By Change Control, changes to the equipment, systems, instruments and rooms after approval of design due to progress of detail engineering can be traced / followed up. Change management keeps the project team especially the engineering department informed, amongst others about identified GLP critical changes which have to be taken into account during the further project phases.

When modifications are required to elements of a qualification protocol after approval of the document but before start of test execution, the modifications must be approved by the person who has approved the original plan.

Small modifications prior to testing can be incorporated into the qualification protocol, without version modification of the protocol. The Validation Manager has to be informed about these modifications immediately. Each modification has to be signed and dated by the person who performs the modification and the Validation Manager.

If larger modifications are necessary, then an updated version of the qualification protocol shall be created.

If a modification is necessary during the test procedure, then the witness shall evaluate this modification. Each modification has to be signed and dated by the person who performs the modification and the witness. The modifications will be finally approved with the approval of the report.

11.0 ABBREVIATION:

Abbreviation	Full text
PVP	Project validation Plan
VMP	Validation Master Plan
cGLP	Current Good laboratory Practices
ISO	International organization for Standardization
LAF	Laminar Air Flow
MLT	Microbial Limit Test
HEPA	High Efficiency particulate Air
USP	United States Pharmacopoeia
US EPA	United States Environment Protection Agency
HVAC	Heating Ventilation Air Conditioning
QA	Quality Assurance
AHU	Air handling Unit
OTS	Over the shelf
URS	User requirement specification
DQ	Design Qualification
IQ	Installation Qualification
OQ	Operational Qualification
PQ	Performance Qualification
EHS	Environment Health Safety
SOP	Standard Operating Procedure
FAT	Factory Acceptance Test
SAT	Site Acceptance test
HMI	Human Machine Interface
PLC	Programmable logic Controller
CFR	Code of Federal Regulations

Abbreviation	Full text
GAMP	Good Automated Manufacturing Practices
SCADA	Supervisory Control and Data Acquisition
DCS	Distributed Control Systems
MES	Manufacturing Execution Systems
LIMS	Laboratory Information Management System
ERP	Enterprise Resource Planning
TOC	Total Organic Carbon
EU GMP	European Good manufacturing Practices
WHO	World Health Organization
cGMP	Current Good manufacturing Practices
CNC	Controlled Not Classified
ISPE	International Society for Pharmaceutical Engineering
ppm	Parts Per Million

12.0 ENCLOSED DOCUMENTS:

Annexure #	Annexure Name*
01	Facility Layout
02	Equipment List
03	Equipment Impact Assessment
04	Responsibilities
05	Template format of Design Qualification protocol and reports
06	Template format of Installation Qualification protocol and reports
07	Template format of Operational Qualification protocol and reports
08	Template format of EDR and reports
09	Template format of Facility Qualification protocol and reports

- For template of DQ, IQ, OQ, EDR and facility qualification refer templates attached to PVP of production.
- Performance qualification protocol and report shall be specific to equipment/ system therefore no standard template format attached.

13.0 REFERENCES:

S.No.	Guidelines / Standards / Books
1.	21 CFR Parts 210 – Current Good Manufacturing Practices in manufacturing, processing, packing/ or holding of drugs, general- April-2013.
2.	21 CFR Parts 211 – Current Good Manufacturing Practices for Finished` Pharmaceuticals April-2013.
3.	EU- Guidelines to Good Manufacturing Practices Part 1, Annexes 1, 11, 15 & 20
4.	European Pharmacopoeia PhEur7.0
5.	Good Automated Manufacturing Practice (GAMP 5) – Guide for validation of automated system.
6.	ICH Q9, Quality Risk Management-Nov.2005
7.	ISO 14644 - Part 1: Classification of Air Cleanliness. (First edition 1999-05-01)
8.	ISO 14644 – Part 3: Metrology and Test Methods (HEPA integrity testing). (First edition 2005-12-15)
9.	ISO 8573- Part 1 to Part 9 for Compressed Air. (Third edition 2010-04-15)
10.	ISPE BASELINE® Guide, Volume 5, Commissioning and Qualification-March-2001
11.	ISPE Good Practice Guide: Commissioning and Qualification of Pharmaceutical Water and Steam systems
12.	Schedule M - Good Manufacturing Practices and Requirement of Premises, Plant and Equipment for Pharmaceutical Product-11th Dec.2001
13.	Supplementary guidelines on good manufacturing practices: validation (WHO Technical Report Series 937, Annexure 4)
14.	TRS 961 annex 3: WHO Good Manufacturing Practices: main principles for pharmaceutical products. forty fifth Report-2011
15.	TRS 970 annex 2: WHO Good Manufacturing Practices: water for pharmaceutical use-2012
16.	WHO GMP Technical Report Series 929 (Water for pharmaceutical use) -Thirty ninth Report.
17.	United States Pharmacopoeia (USP-37 NF-32)-01 Nov.2013.

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

ANNEXURE 01

Quality Control Laboratory Layout

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

ANNEXURE 02

List of Equipment/Instrument

List of Equipment/Instrument

Annexure 02

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

1.0 APPROVAL SIGNATURES:

This document is prepared by the validation team of …… for the project "Oral Solid Dosage Formulation Facility" of …… under the authority of their Project Manager. Hence this document before being effective shall be approved by the Head QA of ……..

PREPARED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		

CHECKED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		
Quality Control		
Engineering		
Quality Assurance		

APPROVED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Head -Quality Assurance		

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

S.No.	Room Number	Equipment/ Instrument Details	
		Name	Capacity
1.		Analytical Balance	220g
2.		pH Meter & Conductivity Meter	NA
3.		Karl Fisher Titrator	NA
4.		Moisture Analyser	NA
5.		Melting Point Apparatus	NA
6.		Leak Test Apparatus	NA
7.		Scuff Proof tester	NA
8.		Bursting Strength Apparatus	NA
9.		Pin Hole Tester	NA
10.		Water Bath	NA
11.		Vernier Caliper	NA
12.		Screw Gauge	NA
13.		Stop Watch	NA
14.		Muffle Furnace digital up to 1000°	NA
15.		Vacuum Oven	NA
16.		Vacuum Pump	NA
17.		UV Cabinet	NA
18.		Magnetic Stirrer	NA
19.		Mechanical Shaker	NA
20.		Fume Hood	NA
21.		Hot Air Oven	NA
22.		Stability Chamber	1000 Ltrs.
23.		Stability Chamber	1000 Ltrs.

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

S.No.	Room Number	Equipment/ Instrument Details	
		Name	Capacity
24.		Stability Chamber	1000 Ltrs.
25.		HPLC	NA
26.		HPLC	NA
27.		FTIR	NA
28.		UV	NA
29.		Dissolution Apparatus	NA
30.		Dissolution Apparatus	NA
31.		Polarimeter	NA
32.		Disintegration Tester	NA
33.		Friability Apparatus	NA
34.		Hardness Tester	NA
35.		Semi-Micro balance	220g
36.		Analytical Balance	220g
37.		Cooling Cabinet	325 Ltrs
38.		Dynamic Pass Box	610 X 610 X 610 mm
39.		Incubator	600 Ltrs
40.		Incubator	600 Ltrs
41.		Incubator	325 Ltrs
42.		Incubator	325 Ltrs
43.		Digital Colony Counter	NA
44.		Microscope	NA
45.		Vertical Autoclave	400 X 600 mm

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

S.No.	Room Number	Equipment/ Instrument Details	
		Name	Capacity
46.		Dynamic Pass Box	610 X 610 X 610 mm
47.		Laminar Air Flow	1280 X 1000 X 1625 mm
48.		Bio Safety Cabinet	1350 X 1035 X 2090 mm
49.		Air Sampler	NA
50.		Dynamic Pass Box	610 X 610 X 610 mm
51.		Fogger	NA
52.		Precision Balance	820g
53.		pH meter	NA
54.		HPHV Steam Heat Sterilizer	600 X 600 X 900 mm
55.		Dynamic Pass Box	610 X 610 X 610 mm

Note: The supporting aids and non-critical utilities are not included in the equipment list as they are non-critical to the production process. Eg-Scoop, Spatula, Cross-over bench, etc.

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

ANNEXURE 03
Equipment/Instrument Impact Assessment

1.0 APPROVAL SIGNATURES:

This document is prepared by the validation team of …….. for the project "Oral Solid Dosage Formulation Facility" of ……..under the authority of their Project Manager. Hence this document before being effective shall be approved by the Head QA of …….

PREPARED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		

CHECKED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		
Quality Control		
Engineering		
Quality Assurance		

APPROVED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Head -Quality Assurance		

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
HPLC		√	X	C	X	√	√	X	√
HPLC		√	X	C	X	√	√	X	√
Dissolution		√	X	C	X	√	√	X	√
Dissolution		√	X	C	X	√	√	X	√
Disintegration tester		√	X	B	X	X	X	√	X
Friability Tester		√	X	B	X	X	X	√	X
Hardness tester		√	X	B	X	X	X	√	X
IR Spectrophotometer (FTIR)		√	X	C	X	√	√	X	√

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
UV Spectrophotometer		√	X	C	X	√	√	X	√
Analytical balance		√	X	B	X	X	X	√	X
Analytical balance		√	X	B	X	X	X	√	X
Semi Micro balance		√	X	B	X	X	X	√	X
pH Meter & conductivity meter		√	X	B	X	X	X	√	X
pH meter		√	X	B	X	X	X	√	X
Polarimeter		√	X	B	X	X	X	√	X
KF Titrator		√	X	C	X	√	√	X	√

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
Moisture Analyzer		√	X	B	X	X	X	√	X
Melting Point Apparatus		√	X	B	X	X	X	√	X
Incubators		X	√	B	X	√	√	X	√
Incubators		X	√	B	X	√	√	X	√
Incubators		X	√	B	X	√	√	X	√
Incubators		X	√	B	X	√	√	X	√
Digital Colony Counter		√	X	B	X	X	X	√	X
Microscope		√	X	A	X	X	X	X	X

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
Air Sampler		√	X	B	X	√	√	X	X
Steam Heat Sterilizer		X	√	NA	√	√	√	X	√
Cooling chamber		X	√	B	X	√	√	X	√
Leak Test Apparatus		√	X	B	X	X	X	√	X
Precision Balance		√	X	B	X	X	X	√	X
Laminar Air Flow		X	√	NA	√	√	√	X	√
Muffle furnace		√	X	A	X	X	X	X	X
Vacuum Oven		√	X	B	X	√	√	X	X

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
U. V. Cabinet		√	X	A	X	√	√	X	X
Hot air Oven		√	X	B	X	√	√	X	X
Magnetic stirrer		√	X	A	X	X	X	X	X
Mechanical shaker		√	X	A	X	X	X	X	X
Fume hood with cabinet		√	X	A	X	X	X	X	X
Bursting strength apparatus		√	X	B	X	X	X	√	X
Pin Hole tester		√	X	B	X	X	X	√	X
Scruff Proof tester		√	X	B	X	X	X	√	X
Vernier caliper		√	X	A	X	X	X	X	X

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
Screw gauge		√	X	A	X	X	X	X	X
Water Bath		√	X	A	X	X	X	X	X
Stop Watch		√	X	A	X	X	X	X	X
Fogger		√	X	A	X	X	X	X	X
Vacuum pump		√	X	A	X	X	X	X	X
Dynamic Pass Box		X	√	NA	X	√	√	X	√
Dynamic Pass Box		X	√	NA	X	√	√	X	√
Dynamic Pass Box		X	√	NA	X	√	√	X	√
Dynamic Pass Box		X	√	NA	X	√	√	X	√

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Equipment/ Instrument		Over the Shelf (OTS) Equipment/ Instrument	Customized equipment	Type	Extent of Qualification				
Name	Equipment/ Instrument ID				DQ	IQ	OQ	IOQ	PQ
Bio safety cabinet		X	√	NA	√	√	√	X	√
Vertical Autoclave		X	√	C	X	√	√	X	√
Stability Chamber		X	√	B	X	√	√	X	√
Stability Chamber		X	√	B	X	√	√	X	√
Stability Chamber		X	√	B	X	√	√	X	√

ANNEXURE 04
Responsibility Profile

Responsibility Profile
Annexure 04

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

1.0 APPROVAL SIGNATURES:

This document is prepared by the validation team of …….. for the project "Oral Solid Dosage Formulation Facility" …….. under the authority of their Project Manager. Hence this document before being effective shall be approved by the Head QA of …….

PREPARED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		

CHECKED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Validation & QA		
Quality Control		
Engineering		
Quality Assurance		

APPROVED BY		
NAME/ FUNCTIONAL AREA	**SIGNATURE**	**DATE**
Head -Quality Assurance		

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

2.0 RESPONSIBILITIES:

Team	Activities	Responsibility	
		Team members	Guiding Team
Validation steering committee	• Scheduling of validation. • Provide resource. • Control completion and problems. • Track the progress. Note: Head of the project shall chair the validation steering committee.		
Head QA	• To head the qualification project team. • To ensure GMP compliance of the qualification documentation (protocols & Reports). • Final review and approval of all protocol and reports.		
Qualification project team leader	• Routine control (planning and coordination) of the qualification project. • Review of qualification documentations.		
Protocol preparation team	• Team to prepare protocol (RA/DQ/IQ/OQ/PQ). • To prepare qualification SOP related to Good Documentation Practices and execution of protocol mentioned in qualification protocol. • PQ protocol ready for execution for critical utilities		
Document review team	• Review the documents (protocols and reports) for further approval. • Maintain consistency in approach and documentation format. • Review deviations and change controls		
Qualification execution team	• Execute the qualification (DQ/IQ/OQ/PQ)		

PROJECT VALIDATION PLAN FOR QUALITY CONTROL FACILITIES

(INCLUDING EQUIPMENTS/UTILITY SYSTEMS & FACILITY QUALIFICATION)

Team	Activities	Responsibility	
		Team members	Guiding Team
Supporting team	• Purchase: To provide the required resources from the market and to provide the details of purchase order numbers. • QC and Microbiology: to test the qualification samples • Instrumentation: to calibrate the instrument during qualification. • Quality control person to support in qualification execution activities.		