MANUFACTURING & QUALITY AUDIT DIVISION
CENTRE FOR DRUG ADMINISTRATION

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GUIDANCE NOTES ON
INSTALLATION AND OPERATIONAL QUALIFICATION

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GUIDANCE NOTES

Subject: INSTALLATION AND OPERATIONAL QUALIFICATION

1.0 Principle

1.1 Installation and Operational Qualification exercises assure through appropriate performance tests and related documentation and records that equipment and ancillary systems or sub-systems have been commissioned correctly and that all future operations will be reliable and within prescribed or specified operating limits.

1.2 These guidance notes outline the principles and basic requirements for the Installation and Operational Qualification of systems or subsystems (equipment) including support systems used in the manufacture of all pharmaceutical products, (including active pharmaceutical ingredients) (APIs). The notes are intended to cover installation and operation of new or modified systems or sub-systems.

1.3 The detail and scope of a qualification exercise is in many respects related to the complexity of the equipment involved and the critical nature of that equipment with respect to the quality of the final product. Nevertheless, the basic principles should be adhered to whether it is the installation and operation of a simple piece of equipment or an autoclave.

1.4 The basic principles are as follows:

1.4.1 The equipment should be correctly installed in accordance with an installation plan, as per supplier and any special (purchaser) requirements,

1.4.2 The requirements for calibration, maintenance and cleaning developed as draft procedures should be reviewed and finally issued as authorised standard operating procedures (SOPs) as part of the SOP programme of the company,

1.4.3 Operating requirements should be established and tests conducted to assure equipment is operating correctly, under normal and “worst case” conditions,

1.4.4 Operator training requirements pertaining to the new equipment should be finalised and documented.

1.5 At various stages in a validation exercise there is need for protocols, documentation, procedures, equipment, specifications, acceptance criteria for test results to be reviewed, checked and authorised. It would

be expected that representatives of the main professional disciplines, e.g. Engineering, Research & Development, Manufacturing, Quality Control and Quality Assurance, involved in manufacture are actively involved in these undertakings with the final authorisation given by a validation committee or the Quality Assurance representative.

2.0 Installation Qualification (I.Q.) - Overview Statement

2.1 Installation Qualification is an essential step preceding the Process Validation exercise. It is normally executed by the Engineering group. The installation of equipment, piping, services and instrumentation is undertaken and checked to engineering drawings Piping & Instrument Diagrams, (P&IDs) and Plant Functional Specifications developed during the project planning stage. During the project planning stage, Installation Qualification should involve the identification of all system elements, service conduits and gauges and the preparation of a documented record that all installed equipment satisfies the planned requirements.

2.2 Identification and documenting of maintenance requirements for each installed item and the collection and collation of supplier operating and working instructions, maintenance and cleaning requirements, should form the minimum documentation for a satisfactory Installation Qualification.

3.0 Installation Qualification - Essential Elements

Installation of Equipment

3.1. The installation of equipment singularly or as a group (plant) should follow well defined plans. The plans will have been developed and finalised following progression through a number of design stages. The plans will normally be available and documented as Equipment Specifications, Plant Functional Specifications and Piping & Instrument Diagrams (P&IDs). During the design stage, an effective Change Management procedure should be in place. All changes to the original design criteria should be documented and after that, appropriate modifications made to Equipment Specifications, Plant Functional Specifications and Piping & Instrument Diagrams (P&IDs).

3.2 During the final phases of the design stage the facilities and equipment necessary for calibration requirements will need to be identified.

Calibration Requirements

3.3

(a) confirmation of calibration of calibrating equipment with reference to the appropriate national standard,

(b) calibration of measuring devices utilised in the Operational Qualification stage, where confirmation of calibration is unavailable,

(c) calibration of measuring devices related to installed equipment,

(d) identification of calibration requirements for measuring devices for the future use of the equipment.

Checking of Suppliers

3.4 For complicated or large pieces of equipment, a pharmaceutical manufacturer may elect to undertake a pre-delivery check of the equipment at the supplier's assembly facility, this pre-delivery check cannot substitute for the Installation Qualification. However, it is acknowledged that the checks conducted and documented at this stage may duplicate a number of the checks conducted at the Installation Qualification stage, hence, there could be a reduction in the scope of the Installation Qualification checks.

Checking at Users

3.5 Installation Qualification requires a formal and systematic check of all installed equipment against the equipment supplier's specifications and additional criteria identified by the user as part of the purchase specifications. At the Installation Qualification, all equipment, gauges and services should be given a serial (or other reference) number and a check conducted that the installed equipment (or plant) has been installed in accord with the current (approved) version of the Piping & Instrument Diagram (P&ID).

3.6 Confirmation of compliance of the operating criteria for the equipment, as installed, with the Plant Functional Specifications and Process Flow Diagrams should be documented.

Installation Qualification

3.7 At the Installation Qualification stage the company should document preventative maintenance requirements for installed equipment. At this stage new equipment and the preventative maintenance requirements should be added to the preventative maintenance schedule of the pharmaceutical manufacturer. Cleaning, including sanitisation and/or sterilisation requirements for the equipment, should be developed in draft documentation form from equipment supplier specifications and operating procedures. The draft cleaning documentation should be finalised following experience and observation at the Operational Qualification stage and then verified at the Performance Qualification stage.

4.0 Operational Qualification (O.Q) - Overview Statement

4.1 Operational Qualification is an exercise oriented to the engineering function, generally referred to as commissioning. Studies on the critical variables (parameters) of the operation of the equipment or systems will define the critical characteristics for operation of the system or sub-system. All testing equipment should be identified and calibrated before use. Test methods should be authorised, implemented and resulting data collected and evaluated.

4.2 It is important at this stage to assure all operational test data conform with pre-determined acceptance criteria for the studies undertaken.

4.3 It is expected that during the Operational Qualification stage the manufacturer should develop draft standard operating procedures (SOPs) for the equipment and services operation, cleaning activities, maintenance requirements and calibration schedules.

4.4 An effective change control procedure should be operational and encompass the whole project from the pre-planning stage through to the final acceptance of the Process Validation exercise.

5.0 Operational Qualification - Essential Elements

5.1 The conduct of an Operational Qualification should follow an authorised protocol. The critical operating parameters for the equipment or the plant should be identified at the Operational Qualification stage. The plans for the Operational Qualification should identify the studies to be undertaken on the critical variables, the sequence of those studies and the measuring equipment to be used and the acceptance criteria to be met. Studies on the critical variables should incorporate specific details and tests that have been developed from specialist knowledge of the process and how the equipment will work (defined in design criteria and specifications).

5.2 Where applicable, simulated product may be used to conduct the Operational Qualification. Studies on the critical variables should include a condition or a set of conditions encompassing upper and lower processing or operating limits and circumstances; commonly referred to as "worst case" conditions. Such conditions should not necessarily induce product or process failure

5.3 The completion of a successful Operation Qualification should allow the finalisation of operation procedures and operator instructions documentation for the equipment. This informationshoudl be used as the basis for training of operators in the requirements for satisfactory operation of the equipment.

5.4 Draft cleaning procedures developed at the Installation Qualification stage should be finalised after a satisfactory Operational Qualification exercise and issued as standard operating procedures (SOPs). Where applicable, these procedures should be validated as part of the Performance Qualification phase.

5.5 The completion of satisfactory Installation Qualification and Operational Qualification exercises should permit a formal "release" of the equipment/plant for the next stage in the validation exercise (Process Validation). The release should not proceed unless calibration, cleaning, preventative maintenance and operator training requirements have been finalised and documented. The release should take the form of written authorisations for both Installation Qualification and Operational Qualification.

6.0 Re-Qualification

6.1 Modifications to, or relocation of, equipment should only follow satisfactory review and authorisation of the documented change proposal through the change control procedure. Part of the review procedure should include consideration of re-qualification of the equipment. Minor changes or changes having no direct impact on final or in-process product quality should be handled through the documentation system of the preventative maintenance programme.

7.0 Qualification of Established (in-use) Equipment

7.1 While it is not possible to undertake the details of an Installation Qualification for established equipment nor the detailed approach for an Operational Qualification, nevertheless there should be data available that support and verify the operating parameters and limits for the critical variables of the operating equipment. Additionally, the calibration, cleaning, preventative maintenance, operating procedures and operator training procedures for the use of the equipment should be documented and in use as standard operating procedures (SOPs).

8.0 References

PIC/S document PI 006-1: Recommendations on Validation Master Plan, Installation and Operational Qualification, Non-Sterile Process Validation, Cleaning Validation.

END OF DOCUMENT

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REVISION HISTORY

Rev No.	DCC Ref No.	Author	Date of Revision	Remarks of Revision
001	-	-	01 Jan 2000	New.
002	-	-	03 Aug 2001	Change of organisation name
003	-	Terrance Ong	09 Dec 2002	Update document format.
004	210	Terrance Ong	01 Mar 2004	1) Change 3D HSA logo to 2D HSA logo. 2) Change Centre name to Centre for Drug Administration 3) Detached Revision History from Guidance Notes.
005	258	Terrance Ong	06 Sep 2004	1) Re-located Revision History to the main document.