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Prequalification Unit Inspection services
WHO PUBLIC INSPECTION REPORT
(WHOPIR)
Finished Product Manufacturer

Part 1	**General information**
Manufacturers details	
Name of manufacturer	**Indoco Remedies Limited (Plant III)**
Corporate address of manufacturer	Indoco Remedies Limited Indoco House 166 CST Road Kalina, Santacruz (E) Mumbai, 400 098 India
Inspected site	
Name & address of inspected manufacturing site if different from that given above	Plot no. L-32, 33, 34, Verna Industrial Area, Verna, Goa- 403 722, India Latitude: 15.3711844 N Longitude: 73.9388948 E
Unit / block / workshop number	Plant-III (Tablet Manufacturing)
Inspection details	
Dates of inspection	16-20 August 2022
Type of inspection	Initial GMP inspection
Introduction	
Brief description of the manufacturing activities	The manufacturing site is located at Verna Industrial Estate surrounded by other pharmaceutical companies as well as electronic industries, including Indoco Plant I and Plant II. The factory is 12 km distance from the Dabolim International Airport, 15 km distance from the Margao Railway Station and 18 km from the Sea Port in Goa.
General information about the company and site	The Head Office and R&D centre of Indoco Remedies Limited was located at Mumbai, India. The company manufactures its product range and also carries out contract manufacturing of solid dosage forms (tablets) under third-party agreements.
History	This was the first WHO PQ inspection of Indoco Remedies Limited (Plant III). Plant III was inspected and approved by the Directorate of Food and Drugs Administration, State Government Goa, Panji, dated 05/05/2011 for the manufacturing and packaging and testing of tablets.

Brief report of inspection activities undertaken – Scope and limitations	
Areas inspected	The following areas were inspected: - Pharmaceutical quality system - Personnel and training - Documentation - Hygiene and sanitization - Process and computerized system validation - Equipment and materials - Production and packaging - Quality control including microbiology laboratory - Utilities
Restrictions	None
Out of scope	Products and facilities not related to WHO prequalification
WHO products covered by the inspection	1. Artemether/Lumefantrine 20mg/120mg Dispersible Tablets (MA181) 2. Artemether/Lumefantrine 20mg/120mg Tablets (MA182) 3. Artemether/Lumefantrine 40mg/240mg Tablets (MA183) 4. Artemether/Lumefantrine 80mg/480mg Tablets (MA184
Abbreviations	**Meaning**
AHU	Air handling unit
ALCOA	Attributable, legible, contemporaneous, original and accurate
API	Active pharmaceutical ingredient
APR	Annual product review
APS	Aseptic process simulation
BMR	Batch manufacturing record
BPR	Batch production record
CC	Change control
CFU	Colony-forming unit
CIP	Cleaning in place
CoA	Certificate of analysis
CpK	Process capability
DQ	Design qualification
EDI	Electronic deionization
EM	Environmental monitoring
FMEA	Failure modes and effects analysis
FPP	Finished pharmaceutical product
FTA	Fault tree analysis
GMP	Good manufacturing practices
GPT	Growth promotion test
HEPA	High efficiency particulate air
HPLC	High performance liquid chromatography (or high-performance liquid chromatography equipment)
HVAC	Heating, ventilation and air conditioning
IQ	Installation qualification
LAF	Laminar air flow

LIMS	Laboratory information management system
MB	Microbiology
MBL	Microbiology laboratory
MF	Master formulae
MFT	Media fill Test
MR	Management review
NC	Nonconformity
NRA	National regulatory agency
OQ	Operational qualification
PHA	Process hazard analysis
PLC	Programmable logic controller
PM	Preventive maintenance
PQ	Performance qualification
PQR	Product quality review
PQS	Pharmaceutical quality system
PW	Purified water
QA	Quality assurance
QC	Quality control
QCL	Quality control laboratory
QMS	Quality management system
QRM	Quality risk management
RA	Risk assessment
RCA	Root cause analysis
RO	Reverse osmosis
SIP	Sterilization in place
SMF	Site master file
SOP	Standard operating procedure
URS	User requirements specifications
UV	Ultraviolet-visible spectrophotometer
WFI	Water for injection

Part 2	**Summary of the findings and comments**

1. Pharmaceutical quality system

The site had a formal documented quality system that met most of the requirements of the current WHO GMP Guidelines. The QA and production departments were independent of each other, and both QC and QA reported to Corporate QA. The policies, master files and procedures that were reviewed and discussed during the inspection were generally of a satisfactory standard. Product and processes were monitored, and these results were considered during batch release. At the time of the inspection, some elements of the quality management system were managed through the track-wise system which included change control, out-of-specification and out of trends, CAPA, deviation and market complaints. The following product quality system elements were reviewed.

Annual product quality reviews (APQRs)

APQR procedure was discussed. The data were collected into Excel sheets and reviewed by QA. Minitab was used for calculating CpK. The review included critical material attributes (CMAs), critical process parameters (CPPs), and critical quality attributes (CQAs). The APQR schedule for 2022 was available which listed 74 products/packs. The schedule was prepared at the start of the year and the date of manufacturing of the first batch for the commercial market was taken as the start date for APQR.

Change Management System

The SOP Change Control (was reviewed. Changes were classified as temporary and permanent and were further divided into critical, major, and minor. For temporary change control, a maximum of three change controls would be allowed before a permanent change was considered. A cross-functional team (CFT) was involved in the evaluation of changes. Steps followed during the process included but were not limited to preliminary impact assessment, impact assessment, identification of CFTs and classification resulting in an action item list, review of impact assessment by QA, verification of each completed task, post action item verification which would include effectiveness check, and lastly review of assessments /comments by QA six monthly. The review focussed on the quantity of change control per department and the status thereof. When the change was not closed out at a predetermined date, the system would generate a report and a message would pop up when the task owner logged in.

The procedure related to the introduction of a new product at the site was reviewed. The F&D (Formulation and development) would request the introduction of a new product, an assessment of feasibility for product manufacturing at the site would be evaluated based on toxicology / HBEL and according to the procedure a qualified toxicologist would be involved, and a cross-contamination risk assessment would be performed. The toxicology assessment would involve genotoxic, reproductive, sensitising and pharmacological potency. Once a decision was made to introduce the new product a change control would be raised.

Deviation management

The SOP on deviation handling was discussed. Deviations were logged in the TrackWise system within 2 working days. After raising a deviation, a Gemba walk was carried out with CFT members. The investigation was carried out using tools such as 5-Why, fishbone analysis etc. A timeline of 15 days was set for completing the deviation for critical deviations whereas 30 days for major and minor deviations.

CAPA (Corrective and Preventative Actions)

The handling of Corrective Actions and Preventative Actions (CAPA) was discussed. CAPAs were tracked in the TrackWise system and covered QMS elements such as self-inspections, external audits, OOS, complaints, deviations, OOT, rejections failures and non-conformances. The SOP stated that after implementation, verification of effectiveness had to be performed before it could be closed. The SOP was found to be comprehensive.

Final Product Release

The release of Batch for Sale and/or Distribution was reviewed. Batch approval was performed on two levels.

- Level 1 - There was a review record for each stage checked and signed by IPQA staff to release to the next step and was performed in the production. During manufacturing and packing, production and QC operations the checklist was completed and signed covering the review of analytical protocols and electronic data for laboratory records (Format No.: F/QA/070/01/06). These were done by production, QA and QC. It was confirmed that QC audit trails were checked on the system as per the checklist and confirmed with a signature by QA.
- Level 2 – This part was performed in the QA office by the batch approving authorities according to the checklist mentioned above. And then the final release was signed on the same document by the Batch Releasing Authorities. The certificate of conformance (CoC) was also signed by batch approving authorities as per the following details: product name, batch number, batch size, expiry date, BMR record number and deviation number if applicable.

Quality risk management (QRM)

The SOP on quality risk management was discussed. The SOP was based on ICH Q9 and WHO QRM 981, Annex-2. QRM was performed considering a cross-functional team and risk was periodically reviewed once every three months. The procedure also stated that risk assessment will be performed when technology transfer, complaints, deviations, regulatory audits, and other areas. In addition, a cause-and-effect diagram or fishbone diagram using 6 M (men, machine, material, method, measurement and mother nature/environment) was applied for risk assessment.

Data integrity (DI)

Handling of data integrity incidents procedure was discussed. The procedure laid down instructions for DI incident identification, categorization, investigation, risk assessment, governance, controls, data review, retention, archiving, backup, reporting and training. The procedure stated that DI observations may be identified through internal audit/self-inspection, regulatory agency inspection, regulatory compliance review, QA review and reviewing observations of analytical reports and raw data review. The DI incidents were categorized into critical, major or minor. The procedure provided a form for the employee to report any DI issues to their heads.

Management review meeting (MRM)

The MRM procedure was discussed. The MRM was held once every month (the first week of every month) and attended by the department heads and senior management. A template was part of the procedure listing various areas to be discussed at the MRM (such as the health of the quality system). The minutes of the meeting were recorded however they did not capture the gist of the discussion with the senior management including areas for improvement, action plan and the timeline for the implementation.

The issues raised following the on-site GMP inspection were adequately addressed.

2. Good manufacturing practices for pharmaceutical products

Basic principles of good manufacturing practices were defined in standard operating procedures. Manufacturing and packaging steps were adequately defined in batch manufacturing records and batch packaging records. The storage and distribution of products ensured batch traceability from receiving to final product and testing. Required resources were available, including adequate premises, equipment, and utilities. Appropriately qualified personnel were employed and in general, training was performed. Qualification and validation were performed following approved protocols.

Indoco Remedies Plant III is a multipurpose manufacturing facility which produces pharmaceutical products for different therapeutic areas. Although the design of the facility was in general adequate to prevent cross-contamination it was noted that there were areas that could be improved in terms of the possible risk of cross-contamination.

The issues raised following the on-site GMP inspection were adequately addressed.

3. Sanitation and hygiene

The level of sanitation and hygiene was generally satisfactory. The company had standard operating procedures as the basis for its approach to personal hygiene and sanitation in its production facilities. There was appropriate gowning both for staff and visitors including pictorials and provision for hand sanitization before entry to production areas. Cleaning tools and agents were available. Classified areas were cleaned frequently following an approved written programme.

The issues raised following the on-site GMP inspection were adequately addressed.

4. Qualification and validation

The company has identified qualification and validation work in their validation master file. The qualification and validation activities for premises, equipment, process, utilities and other areas were defined and the respective schedule was available. Separate procedures and validation master plans were available for cleaning validation, process validation, computerised system validation, analytical method validation and HVAC etc.

The issues raised following the on-site GMP inspection were adequately addressed.

5. Complaints

The handling of complaints was discussed. The complaints were classified into type A and type B wherein type A about adverse drug reactions and type B was further classified into critical (7 working days), major (15 working days) and minor (30 working days). A generic email ID was created for all three plants based in Goa to respond to complaints. In general, the complaints were adequately managed.

6. Product recalls

Recall procedures for Emerging Export Markets, Indian Markets and Regulated Export Markets all have different procedures. The overall process was confirmed to be the same, but SOPs were different in terms of classification, timelines, and assessments required by the different markets. A mock recall would be performed annually during office hours and every three years during out-of-office hours. A mock recall during office hours was performed for US Export Market. The reconciliation was acceptable. An out-of-office hours mock recall was also performed.

The issues raised following the on-site GMP inspection were adequately addressed.

7. Contract production, analysis and other activities

The company has arrangements for contract production and analysis between the contract giver and contract acceptor. Based on the review of the quality agreement between Indoco Remedies Limited and the contract acceptors (such as API manufacturer, contract laboratory and third-party auditor), in general, these agreements were found comprehensive.

The issues raised following the on-site GMP inspection were adequately addressed.

8. Self-inspection, quality audits and suppliers' audits and approval

Self-inspection was reviewed. The SOP defined that the frequency of self-inspections would be twice a year for all the departments, that auditors should be qualified, and that a cross-functional team should perform the audit. Qualified auditors would be certified by the QA manager and would undergo a qualification process. A list of internal auditors was available and included staff from production, QC, production, and QA. The Self-Inspection Scheduler (2022) was reviewed and covered all areas such as production, warehouse, engineering, personnel, QC, QA, and IT.

The supplier audits and approval SOP stated that all APIs would be audited before validation and manufacturing and therefore no risk assessment would be performed. This statement may be misinterpreted to understand that no risk assessment will be done at all.

The issues raised following the on-site GMP inspection were adequately addressed.

9. Personnel

Organograms were reviewed and versions were controlled and referenced to SOPs. The roles and separation between production and QA were adequately depicted on the site organogram. The site QC and QA reported separately to corporate QA. Engineering reported to the corporate engineering manager. There were separate site organograms for QA, QC, Production, IT, engineering, QC and Warehouse. Validation was reported to the QA manager. The QC organogram differentiated between the different areas within the main laboratory, each with its section head e.g., Validation, Stability, Raw Material, Packing Material, GLP, FP/in-process, Micro and reviewer.

Indoco Plant III had a total of 384 personnel members including 173 in production, 46 in quality assurance, 99 in quality control, 2 in IT, 22 in stores and 32 in engineering and support services. The job descriptions were reviewed for key personnel. In general, job descriptions seemed to be adequate with a few issues identified.

The issues raised following the on-site GMP inspection were adequately addressed.

10. Training

The procedure for training was managed. Induction training for new and transferred employees was performed. Technical training included version change training on SOPs, on-the-job training, refresher training (annually planned) or re-training. In addition, reading and understanding of SOPs were implemented for executive staff only and no assessment was required. The assessment included a written test with a minimum 80 % passing rate. Retraining was performed and concepts were discussed for those who failed. The SOP indicated a maximum failing of three times, whereafter the person would be re-assigned to something more appropriate.

The issues raised following the on-site GMP inspection were adequately addressed.

11. Personal hygiene

In general, the procedures on health and hygiene were followed and new personnel and medical examinations were foreseen before joining the company. The personnel gowning procedure was appropriate and was generally followed. It was noted that primary gowning was changed every second day. For production areas, a full one-piece suite was donned, over primary gowns together with shoe covers, head covers as well as masks. These were changed after each shift. No evidence of eating and smoking was observed in primary areas.

12. Premises

The facility was situated in a pharmaceutical industrial area. Generally, the layout of the premises was adequate and production cubicles such as granulation (1A, 1B and II), blending (I & II), compression (I, II and III) and primary packaging were generally provided with separate material and man airlocks. Secondary packaging entrance and gowning were separate. Most areas were well maintained.

Storage areas for the warehousing of raw materials and finished goods were of sufficient capacity and were stored in high-rising mobile racking. Storage areas were maintained between 15 and 25°C and 40 to 60% relative humidity (RH). Monitoring was done through the SCADA system. Temperature mapping was confirmed to be performed for three seasons and would be repeated every two years. Printed records for temperature monitoring and out-of-alarm records were reviewed and found to be acceptable. The quarantine, primary packaging and finished product storage areas were located on the ground floor and the raw material stoor on the 2nd floor adjacent to the production areas.

The inspectors visited the pilot production area which was used for manufacturing Artemether and Lumefantrine tablets exhibit batches for WHO PQ. The gowning procedure was adequate as a boiler suit was used for personnel working inside the processing areas. The pilot area has a storage area for storing various change parts including finger bags, sieves, screens, multi-mill etc. The finger bags used for Artemether/Lumefantrine tablets and the respective logbook were verified. It was indicated that dedicated finger bags were used for various products. Similarly, dies and punches used for Artemether/Lumefantrine tablets were verified.

The issues raised following the on-site GMP inspection were adequately addressed.

13. Equipment

Manufacturing equipment was generally appropriately installed. Preventative maintenance was performed following written procedures. At the time of the inspection monitoring of preventative maintenance activities was performed via a manual system and records were available and reviewed. Equipment history cards were used to record preventative maintenance and breakdown of equipment. It was noted that the company would start implementing their preventative maintenance system using SAP within 2-3 months. A planned preventative maintenance schedule was in place and found to be acceptable.

The issues raised following the on-site GMP inspection were adequately addressed.

14. Materials

Incoming materials (active, excipients) were received through a receiving bay and primary packaging through a dedicated receiving bay for primary packaging materials. The receiving bays were equipped with trap stations used for rodent bait. It was noted that the company only had one sampling and one dispensing area and no risk assessment was performed to identify any risk of cross-contamination or contamination in a multiproduct facility.

Sampling for APIs was performed on 100 % of containers whereby the ID testing would be performed on each container, but assay samples would be blended for a maximum of ten samples. The company has just one sampling area for all incoming materials except packaging materials. Separate personnel and material entry were provided before entering the respective sampling area. The pressure differential (DP) between the corridor and the personnel change room was set NLT 1.6 mm WC. The DP was manually monitored. It was informed that dedicated sampling rods and spoons were used for various APIs.

The finished goods store had an automatic racking system wherein T/RH had the same requirements as a raw material store. The SAP was used for the management of location codes as well as for receiving and issuing the FG quantities. There was no stock available of Artemether and Lumefantrine tablets. Artemether was in stock.

The issues raised following the on-site GMP inspection were adequately addressed.

15. Documentation

In general, the documentation system was satisfactorily established and maintained; documents were approved, signed, and dated by appropriate responsible persons, reviewed, and kept up to date. Specifications and testing procedures were available.

16. Good practices in production

The inspectors visited the 2nd floor of the facility on the afternoon of day 3 and the following areas were inspected:

- Dispensing, temporary storage and day storage area
- Granulation charging areas I, II and III
- Compression IV
- Blending I and II (bin blender and octagonal blender)
- Granulation suite I, II and III (Granulation III will be used for WHO products whereas exhibit batches were produced in the pilot area, located on the same floor)
- Granulation suite III was comprised of a separate material and personnel entry
- Lubricated granules area

Clean areas for the manufacture of non-sterile OSD products were classified (ISO 8) and was a multi-product facility. Materials were transferred through a material elevator to the second floor for dispensing. Dispensed materials could be held for 30 validated days.

The issues raised following the on-site GMP inspection were adequately addressed.

17. Good practices in quality control

The quality control laboratory was located on the 3rd floor of the facility. The entrance to the laboratory was through separate change rooms for chemistry and microbiology laboratories. There were separate rooms for instruments e.g., balance room etc., chemical analysis and washing/cleaning. Samples were received through the pass-box and logged onto the Caliber LIMS 3.6.1. Calibre LIMS was used for the analysis, protocol generation and issuance of the certificate of analysis. A total of 99 staff shared between the chemistry and microbiology laboratories. The logbooks for instruments and other equipment such as columns and calibration records were reviewed and found to be generally adequate. Verification of instruments was recorded. A GLP team was responsible for the calibration and requalification of equipment and instruments.

The issues raised following the on-site GMP inspection were adequately addressed.

Part 3	Conclusion – Inspection outcome

Based on the areas inspected, the people met and the documents reviewed, and considering the findings of the inspection, including the observations listed in the Inspection Report, ***Indoco Remedies Ltd,*** located at ***L-32, 33 & 34, Verna Industrial Estate, Verna, Goa, 403722, India*** was considered to be operating at an acceptable level of compliance with WHO GMP Guidelines.

All the non-compliances observed during the inspection that were listed in the full report as well as those reflected in the WHOPIR were addressed by the manufacturer, to a satisfactory level, prior to the publication of the WHOPIR

This WHOPIR will remain valid for 3 years, provided that the outcome of any inspection conducted during this period is positive.

Part 4	List of WHO Guidelines referenced in the inspection report

1. WHO good manufacturing practices for pharmaceutical products: main principles. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-eighth Report Geneva, World Health Organization, 2014 (WHO Technical Report Series, No. 986), Annex 2. ***Short name: WHO TRS No. 986, Annex 2***
   https://digicollections.net/medicinedocs/documents/s21467en/s21467en.pdf

2. WHO good manufacturing practices for active pharmaceutical ingredients. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fourth Report. Geneva, World Health Organization, 2010 (WHO Technical Report Series, No. 957), Annex 2. ***Short name: WHO TRS No. 957, Annex 2***
   untitled (digicollections.net)

3. WHO Good Manufacturing Practices: water for pharmaceutical use. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fifth Report. Geneva, World Health Organization, 2021 (WHO Technical Report Series, No. 1033), Annex 3.
   Short name: WHO TRS No. 1033, Annex 3
   9789240020900-eng.pdf (who.int)

4. WHO guidelines for sampling of pharmaceutical products and related materials. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Thirty-ninth Report. Geneva, World Health Organization, 2005 (WHO Technical Report Series, No. 929), Annex 4.
   Short name: WHO TRS No. 929, Annex 4
   https://digicollections.net/medicinedocs/documents/s21440en/s21440en.pdf

5. Guidelines on heating, ventilation and air-conditioning systems for non-sterile pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-second Report Geneva, World Health Organization, 2018 (WHO Technical Report Series, No. 1010), Annex 8. **Short name: WHO TRS No. 1010, Annex 8**
   https://digicollections.net/medicinedocs/documents/s23455en/s23455en.pdf

6. Supplementary guidelines on good manufacturing practices: validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fortieth Report. Geneva, World Health Organization, 2006 (WHO Technical Report Series, No. 937), Annex 4.
Short name: WHO TRS No. 937, Annex 4
https://digicollections.net/medicinedocs/documents/s20108en/s20108en.pdf

7. WHO good practices for pharmaceutical quality control laboratories. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fourth Report. Geneva, World Health Organization, 2010 (WHO Technical Report Series, No. 957, Annex 1.
Short name: WHO TRS No. 961, 957), Annex 1
https://digicollections.net/medicinedocs/documents/s18681en/s18681en.pdf

8. WHO Good Practices for Pharmaceutical Products Containing Hazardous Substances. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fourth Report. Geneva, World Health Organization, 2010 (WHO Technical Report Series, No. 957), Annex 3.
Short name: WHO TRS No. 957, Annex 3
https://digicollections.net/medicinedocs/documents/s22358en/s22358en.pdf

9. WHO good manufacturing practices for sterile pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fifth Report Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 6.
Short name: WHO TRS No. 961, Annex 6
https://digicollections.net/medicinedocs/documents/s19959en/s19959en.pdf

10. WHO guidelines on transfer of technology in pharmaceutical manufacturing WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-Fifth Report Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 7.
Short name: WHO TRS No. 961, Annex 7
https://digicollections.net/medicinedocs/documents/s18677en/s18677en.pdf

11. Model guidance for the storage and transport of time-and temperature-sensitive pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fifth Report Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 9. ***Short name: WHO TRS No. 961, Annex 9***
https://digicollections.net/medicinedocs/documents/s18683en/s18683en.pdf

12. General guidelines for the establishment maintenance and distribution of chemical reference substances. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-first Report Geneva, World Health Organization 2007 (WHO Technical Report Series, No.943) Annex 3. ***Short name: WHO TRS No. 943, Annex 3***
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13. WHO good practices for pharmaceutical microbiology laboratories. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fifth Report Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 2.
Short name: WHO TRS No. 961, Annex 2
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14. WHO guidelines on quality risk management. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-seventh Report Geneva, World Health Organization, 2013 (WHO Technical Report Series, No. 981), Annex 2.
Short name: WHO TRS No. 981, Annex 2
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15. WHO guidelines on variation to a prequalified product. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-seventh Report Geneva, World Health Organization, 2013 (WHO Technical Report Series, No. 981), Annex 3.
Short name: WHO TRS No. 981, Annex 3
https://digicollections.net/medicinedocs/#d/s20175en/

16. WHO guidelines for drafting a site master file. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fifth Report Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 14.
Short name: WHO TRS No. 961, Annex 14
http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1

17. Good Manufacturing Practices: Guidelines on validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-third Report Geneva, World Health Organization, 2019 (WHO Technical Report Series, No. 1019), Annex 3. ***Short name: WHO TRS No. 1019, Annex 3***
https://digicollections.net/medicinedocs/documents/s23697en/s23697en.pdf

18. WHO General guidance on hold-time studies WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-ninth Report Geneva, World Health Organization, 2015 (WHO Technical Report Series, No. 992), Annex 4. ***Short name: WHO TRS No. 992, Annex 4***
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/WHO_TRS_992_web.pdf

19. WHO Technical supplements to Model Guidance for storage and transport of time – and temperature – sensitive pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-ninth Report Geneva, World Health Organization, 2015 (WHO Technical Report Series, No. 992), Annex 5. ***Short name: WHO TRS No. 992, Annex 5***
Essential Medicines and Health Products Information Portal (digicollections.net)

20. WHO Recommendations for quality requirements when plant – derived artemisin is used as a starting material in the production of antimalarial active pharmaceutical ingredients. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-ninth Report Geneva, World Health Organization, 2015 (WHO Technical Report Series, No. 992), Annex 6
Short name: WHO TRS No. 992, Annex 6
https://www.who.int/publications/m/item/who-recommendations-for-quality-requirements-when-plant-derived-artemisinin-is-used-as-a-starting-material-in-the-production-of-antimalarial-active-pharmaceutical-ingredients---trs-992---annex-6

21. Guideline on data integrity. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fifth Report Geneva, World Health Organization, 2021 (WHO Technical Report Series, No. 1033), Annex 4. ***Short name: WHO TRS No. 1033, Annex 4***
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22. WHO general guidance on variations to multisource pharmaceutical products. *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fiftieth Report* Geneva, World Health Organization, 2016 (WHO Technical Report Series, No. 996), Annex 10.
Short name: WHO TRS No. 996, Annex 10
http://www.who.int/medicines/publications/pharmprep/WHO_TRS_996_annex10.pdf

23. Stability testing of active pharmaceutical ingredients and finished pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-second Report Geneva, World Health Organization, 2018 (WHO Technical Report Series, No. 1010), Annex 10.
Short name: WHO TRS No. 1010, Annex 10
http://www.who.int/medicines/publications/pharmprep/WHO_TRS_996_annex10.pdf

24. Guidelines on heating, ventilation and air-conditioning systems for non-sterile pharmaceutical products. Part 2: Interpretation of Guidelines on heating, ventilation and air-conditionning systems for non-sterile pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-third Report Geneva, World Health Organization, 2018 (WHO Technical Report Series, No. 1019), Annex 2. **Short name: WHO TRS No. 1019, Annex 2**
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25. Points to consider when including Health-Based Exposure Limits in cleaning validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fifth Report Geneva, World Health Organization, 2021 (WHO Technical Report Series, No. 1033), Annex 2. **Short name: WHO TRS No. 1033, Annex 2**
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26. Points to consider for manufacturers and inspectors: environmental aspects of manufacturing for the prevention of antimicrobial resistance. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fourth Report Geneva, World Health Organization, 2020 (WHO Technical Report Series, No. 1025), Annex 6. **Short name: WHO TRS No. 1025, Annex 6**
9789240001824-eng.pdf (who.int)

27. Production of water for injection by means other than distillation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fourth Report. Geneva, World Health Organization, 2020 (WHO Technical Report Series, No. 1025), Annex 3. ***Short name: WHO TRS No. 1025, Annex 3***
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28. Good chromatography practice. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fourth Report. Geneva, World Health Organization, 2020 (WHO Technical Report Series, No. 1025), Annex 4. ***Short name: WHO TRS No. 1025, Annex 4***
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