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

Part 1	**General information**
Manufacturers details	
Name of manufacturer	**The Government Pharmaceutical Organization (GPO)**
Corporate address of manufacturer	75/1 Rama VI Road, Ratchathewi, Bangkok Thailand
Inspected site	
Name & address of inspected manufacturing site if different from that given above	The Government Pharmaceutical Organization, Rangsit Pharmaceutical Production Plant 1, 138 Moo 4 Rangsit, Nakhonnayok Road, Bueng Sanan, Thanyaburi, Pathumthani, Thailand, 12110
Unit / block / workshop number	Production Module-I (Production Section 1)
Inspection details	
Dates of inspection	09-13 September 2019
Type of inspection	Routine GMP inspection
Introduction	
Brief description of the manufacturing activities	The pharmaceutical production plant manufactures only OSD formulations (tablets and hard gelatin capsules). Production in Module – I
General information about the company and site	The manufacturing site is located 70 km away from Bangkok city and built on 158,400 square meters land surrounded by Maha Vajiralongkorn Cancer Hospital and residential areas. The manufacturing operations were started in 2015. The Government Pharmaceutical Organization (GPO) is a state enterprise under the Ministry of Public Health of Thailand. The main responsibility of GPO is to supply mainly the domestic market with medicines and pharmaceutical products in affordable price. Within the site, there are two separate facilities; Chemicals Department (launched in 1999) and Rangsit Pharmaceutical Production (RPP) Plant 1 (with 4 Modules and a Pilot plant). D-U-N-S No. (Data Universal Numbering System): # 661741929 Global Positioning System (GPS) details: Latitude 14.05773 Longitude 100.83699
History	This was the second WHO PQ inspection of GPO. The GPO was first inspected by WHO PQ in June 2017. In addition, the site had been regularly inspected by the Thai FDA.

Brief report of inspection activities undertaken – Scope and limitations	
Areas inspected	Module-I (Production Section 1) located in building RPP 1, 1st floor with the corresponding warehouses, utilities and quality control. o Quality Assurance o Qualification and validation o Complaints o Vendors evaluation o Contracts o Premises o Equipment o Documentation o Production o Quality control
Restrictions	None
Out of scope	Modules II, III, IV and the Pilot plant located in the same building
WHO products covered by the inspection	Efavirenz 600mg tablets (HA681)
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	Non conformity
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 (PQS)

In general, a PQS was implemented. Production and control operations were independently managed and specified in written form and GMP requirements were generally being followed. Managerial responsibilities were specified in job-descriptions. Product and processes were monitored, and the results taken into account in batch release and regular reviews of the quality of pharmaceutical products were conducted. Periodic management reviews were performed. The quality management, quality control, production and engineering functions were supported by IT software, including the following:

No.	Software Name
1	Electronic Quality Management Systems (eQMS)
2	Laboratory Instrument Management System (LIMS)
3	Manufacturing Execution System (MES)
4	Building Automation System: BAS (Main Plant)
5	Environment Monitoring System: EMS (Pilot)
6	Supervisory Control and Data Acquisition: SCADA
7	Chromeleon

Product quality review/annual product review (PQR)
The SOP on product quality reviews has been revised since the last inspection. According to the SOP, PQRs are to be prepared for all the manufactured batches and products in every fiscal year, 12 months, rolling based on a PQR preparation plan. The plans for year 2018 and 2019 together with the 2 PQRs of Efavirenz 600 mg tablet manufactured in fiscal year 2017 were discussed.

Quality risk management (QRM)
The basic principles of the quality risk management were summarized in "Risk Management Manual", naming the following areas to be considered: quality assurance, production, warehouse, engineering, quality control, personnel, EHS. The risk management plan detailed the topics, responsibilities, activities.

Change controls
Change control eQMS was started from 6th June 2017. A total of 296 changes were raised as of 30th August 2019. Change control system procedure was in place.

Deviation management
Deviation report procedure was discussed. The deviations were handled through eQMS which came into operation from 1st June 2017. Total of 309 deviations (256 unplanned and rest planned deviation) were raised until 29th August 2019. Deviations were classified into unplanned and planned deviations and were supported with examples. Planned deviations were further classified into permanent, one-time and temporary and investigation.

Corrective action and preventive action (CAPA)

Corrective action and preventive action procedure was discussed. The CAPA management was handled through eQMS. The CAPA flow diagram was part of the procedure. The procedure referenced change control system and risk management procedure.

Root cause analysis (RCA)

A separate procedure root cause analysis was in place. In general, the procedure was found adequate which provided techniques (cause and effect, fault tree etc.) to be used to carry out investigation.

Management review

The management system review covered amongst the outcome of the self-audits, CAPAs, quality complaints, etc. The minutes of the last meeting held in June 2019 was discussed.

2. Good manufacturing practices for pharmaceutical products

Manufacturing processes were generally clearly defined and systematically reviewed. Qualifications and validations were performed where required and documents were produced where requested. Necessary resources were provided, and records were made during manufacture. Significant deviations from the initial protocol were recorded and investigated, root causes were determined, and corrective and preventive action were implemented. Procedures were in-place for tracking corrective and preventive actions and their implementation. A system was available to recall any batch of product from sale or supply and complaints about marketed products were examined, the causes of quality defects were required to be investigated, and appropriate measures taken in respect of the defective products.

Efavirenz 600mg tablets was produced in Module-I which is a shared facility. Other ARV products were also produced in the same Module-I. However, as per the prevailing practice; GPO adopt the practice of one-product at a time and products are executed on campaign basis. It was noted that the GPO had not produced any batches of Efavirenz 600mg tablets for WHO PQ markets. It should be noted that GPO produces Efavirenz 600mg tablets for the domestic market having similar manufacturing formula. Issues noted from this section have been addressed and will be verified during future inspections.

3. Sanitation and hygiene

The company had a standard operating procedure as the basis for its approach to personal hygiene and sanitation in its production facilities. Areas were cleaned frequently in accordance with an approved written program and SOPs.

4. Qualification and validation

The key elements of a qualification and validation program were defined and documented in the validation policy and validation master plan. Validation master plan provided an overall validation philosophy and approach to be followed for validation activities. The VMP was applicable for the entire OSD facility. The annual validation plan was restricted to the newly purchased instruments.

Process validation

Process validation of Efavirenz 600mg tablets with new Korsch tableting machine (XT600) was discussed. Three batches were taken in March 2018 to validate new Korsch machine. In general, process validation was adequately performed.

Computer system validation

Computerised systems validation master plan was in place which outlined sequence of activities to be performed to ensure computerised systems supported the operation of the Rangsit Pharmaceutical Production Plant 1.

Cleaning validation

Cleaning validation procedure was in place. Issues noted from this section have been addressed and will be verified during future inspections.

5. Complaints

Handling of customer complaints was discussed. It was noted that all complaints were received by the customer relationship management (CRM) division which is located at GPO's Rama VI site. The complaints were logged into eQMS system and were classified as high, medium, low and adverse event (AE)/adverse drug reaction (ADR). The AE/ADR were handled through a separate procedure. The complaints were investigated by the site and feedback was given back to the CRM. High risk complaints were handled through recall procedure. The classification of complaints was supported with adequate examples.
Issues noted from this section have been addressed and will be verified during future inspections.

6. Product recalls

Product recall and withdrawal procedure was in place. The Managing Director of the company has the overall responsibility to recall product who was assisted by the quality assurance team. The recall was classified into three categories, Class I, II and III. The mock recall was performed based on protocol study.
Issues noted from this section have been addressed and will be verified during future inspections.

7. Contract production, analysis and other activities

No production or quality control related to the inspected product was out-sourced.

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

The procedure of self-inspections defined the audit team, competence of the team members, areas to be audited and the audit frequency (at least 1 time/year). Additionally, the auditors were qualified according to work instructions. The Audit schedule for 2019 was available.
Issues noted from this section have been addressed and will be verified during future inspections.

9. Personnel

The manufacturer had an adequate number of personnel with the necessary qualifications and practical experience. Responsible staff, specific duties were recorded in written job descriptions. Personnel met were aware of the principles of GMP and received initial and continuing training, including hygiene instructions, relevant to their needs. Steps were taken to prevent unauthorized people from entering production, storage and QC areas.
Issues noted from this section have been addressed and will be verified during future inspections.

10. Training

Training procedure was in place and it coordinated by the QA. Training needs were identified by each department in their training matrix. Training matrix was prepared by each section/department using eQMS. The procedure described various training that were being provided to the staff (induction, refresher training on annual basis, cGMP training on annual basis, and retraining). Training matrix was developed for each staff by the department head covering list of SOPs that should be read as part of their training. Issues noted from this section have been addressed and will be verified during future inspections.

11. Personal hygiene

The medical check of the staff is required before commencing the job then annually according to a schedule. Staff is required to report to the supervisor any medical issue and to stop related activities which may affect the job performance or may jeopardize the product.

Personnel may enter the Production Module-I, Module-II and the primary packaging through three separate changing rooms. The changing rules including the bidirectional personnel flow in the changing rooms were common.

Separate change rooms (for staff and visitors) were in place. The second change room was also separate for staff and visitors. In general, the gowning procedure was found adequate and was supported with SOPs and pictorial presentation.

12. Premises

The section layout drawings were available. The drawing of the 1st floor was discussed. Inspectors visited the warehouse and covered the following areas on day 3:

- Receiving area
- Shipping/dispatch area
- Quarantine and approved area
- Packaging material area
- Sampling area
- Dispensing area
- Reject area (biometric access) used to store raw materials and finished products

The company had been using the Manufacturing Execution System (MES) for material management. The raw materials (API and excipient) were stored below 25ºC. Building Automatic System (BAS) was used to monitor temperature and relative humidity. The premises had two sampling rooms, one each for active and excipients. Beside this, a separate sampling area was provided for the primary packaging materials. Sampling for identification was performed 100% whereas the square root (n)+1 sampling approach was used testing the incoming materials. There were 6 dispensing areas available. Dispensing was performed using MES wherein balances were connected with MES. Module-I and Module-II are located on the ground floor, first floor for mezzanine and second floor for Module-III and IV. The area was maintained through BAS wherein temperature, humidity and differential pressure were digitally displayed.

The manufacturing area was classified as ISO 8 and core processing areas were negatively pressurized to the adjacent clean corridor. The Building Automation System (BAS) was used to display differential pressures across rooms, temperature and relative humidity. Separate material airlocks (MAL) and personnel airlocks (PAL) were available before entering to the respective core processing cubicles.

The manufacturing area was equipped with the following sections:

- Granulation suites (RMG, FBD, sifter, blender and mill)
- Compression machine
- Coating machine.

Issues noted from this section have been addressed and will be verified during future inspections.

13. Equipment

Equipment was located, designed, constructed, adapted, and maintained to suit the operations to be carried out. The layout and design of equipment minimize the risk of errors and permit effective cleaning and maintenance to avoid cross-contamination, build-up of dust or dirt.
Issues noted from this section have addressed and will be verified during future inspections.

14. Materials

The general procedure of material management was in place. The product identification and coding were managed according to the procedure. Different coding systems were in place for raw materials (APIs/excipients/capsule shells) packaging materials and finished products. The incoming materials received an internal identification code (internal batch number) which was reflected in a label prepared by the warehouse staff. The content of the label was: barcode, load number, carrier number, location, material name, material number, internal batch number, expiry date, quantity. The inventory and the material status were reflected in the SAP and MES connected with an interface enabling automatic data transfer/migration between the systems.

Suppliers of the raw materials and packaging materials were qualified based on the procedure. The basis of the qualification was amongst questionnaire, COA, stability results, in-house testing, supplier audit as applicable. The supplier qualification documents of Efavirenz and HDPE bottle were discussed and available. The approved supplier list was available and contained the above suppliers.
Issues noted from this section have been addressed and will be verified during future inspections.

15. Documentation

Document control system was in place. The documents were handled through eQMS and through manual logbook. There were four level of documents, Level 1 (policies, quality manual, SMF, VMP etc), Level 2 (Validation plan, SOPs), Level 3 (work instruction, standard testing procedures, master batch processing record, specification and stability study protocol) and Level 4 (executed records including forms, worksheets, batch processing records, logbook, master list and index list). All documents were revised once every two years according document control procedure. Document distribution was maintained through eQMS and superseded documents were retrieved and destroyed.
Issues noted from this section have been addressed and will be verified during future inspections.

16. Good practices in production

At the time of inspection there were ongoing production operations. The inspectors had covered the following sub areas of Module-I:

- Dispensed material area
- Cleaned equipment area (equipment was manually and automatically cleaned using IBC washing station
- Binder preparation room (supply of purified water)
- Granulation suite (equipped with RMG and FBD)
- Sifting area
- Blending area
- Tablet compression machine
- Coating

In general, the production area was found clean and tidy.
Issues noted from this section have been addressed and will be verified during future inspections.

17. Good practices in quality control

The quality control laboratory was located on the 2nd floor and was broadly divided into chemistry and microbiology section. Before entering the chemistry section, visitors had to put on gown and shoe cover. Samples were collected by the QA from production and sent to the laboratory through pass-box. Incoming samples were logged in manual logbook as well as in the LIMS. 100% identification was performed on APIs using Raman Spectrometer or Infrared spectrometer.

The laboratory was equipped with 13 HPLC (Agilent & Thermo) and 1 GC (Agilent). The chromatographic equipment were connected with Chromeleon 7.2 software. The laboratory purchases primary reference standards from USP whereas working standards were received from GPO's Rama VI site. The working standards were received with certificate of analysis confirming traceability with USP. The reference and working standards were stored in refrigerator (EH00107, 2-8ºC) and at room temperature (cabinet in the sample reception room).

Retention samples

Retention samples were stored in mezzanine floor 1. These retention samples were stored in compactors and room was locked. It was noted that three batches of Efavirenz 600mg tablets were destroyed after 1 year of expiry.

Microbiology laboratory

Microbiology laboratory was well designed and well equipped. Separate personnel airlock (PAL) and material airlock (MAL) were provided for personnel before entering to identification room (culture handling area) and microbial limit test. The microbiology laboratory has 10 staff (3 pharmacists, 4 analysts and 3 analyst assistant). The identification room (culture handling area) and microbial limit test area were classified Grade D. In addition to water testing (pre-treatment using pour plate and purified water using membrane filtration), laboratory also performed environmental monitoring. The growth promotion test (GPT) was performed on each dehydrated media before use. Not more than 5 passages allowed. Biosafety hazard cabinet Class-II was used for identification room (culture handling area) and microbial limit test. Also, Biosafety hazard cabinet Class-II was used for media plate preparation.
Issues noted from this section have been addressed and will be verified during future inspections.

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, ***The Government Pharmaceutical Organization (Rangsit Pharmaceutical Production Plant 1)***, located at ***Pathumthani, Thailand*** 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***
   http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_986/en/
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 GMP for APIs*** or ***TRS No. 957, Annex 2***
   http://www.who.int/medicines/publications/44threport/en/

3. WHO good manufacturing practices: water for pharmaceutical use. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fourth-sixth Report. Geneva, World Health Organization, 2012 (WHO Technical Report Series, No. 970), Annex 2
   Short name: WHO TRS No. 970, Annex 2
   http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_970/en/
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
   http://whqlibdoc.who.int/trs/WHO_TRS_929_eng.pdf?ua=1

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**
   http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_1010/en/

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
   http://whqlibdoc.who.int/trs/WHO_TRS_937_eng.pdf?ua=1

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 GPPQCL Guidelines or ***TRS No. 957, Annex 1***
   http://www.who.int/medicines/publications/44threport/en/

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 2
   Short name: WHO TRS No. 957, Annex 2
   http://www.who.int/medicines/publications/44threport/en/

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
   http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1

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
    http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1

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***
    http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1

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
    http://whqlibdoc.who.int/trs/WHO_TRS_943_eng.pdf?ua=1

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
    http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1

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***
    http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_981/en/

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***
    http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_981/en/

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. WHO Guidelines on good manufacturing practices: validation, Appendix 7: non-sterile process validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-ninth Report Geneva, World Health Organization, 2015 (WHO Technical Report Series, No. 992), Annex 3. ***Short name: WHO TRS No. 992, Annex 3***
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/WHO_TRS_992_web.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***
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/WHO_TRS_992_web.pdf

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
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/WHO_TRS_992_web.pdf

21. Guidance on good data and record management practices. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fiftieth Report Geneva, World Health Organization, 2016 (WHO Technical Report Series, No. 996), Annex 5
Short name: WHO GDRMP or ***WHO TRS No. 996, Annex 5***
http://www.who.int/medicines/publications/pharmprep/WHO_TRS_996_annex05.pdf

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