

**Prequalification Team Inspection services
WHO PUBLIC INSPECTION REPORT
of the FPP manufacturer**

Part 1	General information
Manufacturers details	
Company information	
Name of manufacturer	MSN Laboratories Private Limited
Corporate address of manufacturer	MSN House, Plot No.: C-24, Sanath Nagar Industrial Estate, Sanath Nagar, Hyderabad-500 018, Telangana, INDIA
Contact person	Mr. AVS Ravi Shankar ravishankaravs@msnlabs.com
Inspected site	
Address of inspected manufacturing site if different from that given above	MSN Laboratories Private Limited, Formulations Division, Plot No.: 42, Anrich Industrial Estate, Bollaram, Sangareddy District-502 325, Telangana, INDIA
Unit / block / workshop number	Formulations Division - Unit 1
Inspection details	
Dates of inspection	22- 24 January 2018
Type of inspection	Routine inspection
Representative from the National Regulatory Authority	Central Drugs Standard Control Organization (CDSCO) was invited and attended the inspection
Introduction	
Brief summary of the manufacturing activities	MSN facilities at Bollaram engaged in manufacturing of tablets, capsules and sterile products for injection
General information about the company and site	MSN Group of companies was established in 2003. The group started its operations by manufacturing APIs and further ventured into finished products in 2007. The company changed its name to MSN Laboratories Private Limited in February 2013 and a change in address (not location) was introduced by local authorities in 2017. The new addresses for MSN Headquarters and Bollaram manufacturing site are reported in Part 1. The first formulations plant was located in Bollaram and it became operational in 2007. MSN Laboratories Pvt. Ltd. Formulations Division (hereafter referred to as “MSN”) was located in Bollaram, about 25 km from the city of Hyderabad. The factory comprised of

	<p>three buildings including the main Production building, Utility block and the F.G Office & Instrumentation building. The site manufactured both oral solid dosage forms and injectable dosage forms. Production consisted of two separate manufacturing areas located in the same block: one for sterile injectable products and another one for oral solid dosage forms. An extension of the facilities affecting all four floors was completed in 2017. A new granulation and compression area were introduced as well as packaging and storage areas. There were approximately 280 employees on site operating in two shifts</p>
History	<p>The site was previously inspected by WHO during 7- 10 April 2014. In 2016 and 2017 authorities of the following countries inspected the site:</p> <ul style="list-style-type: none"> • Peru • Brazil • Nigeria • Romania • Tanzania • Saudi Arabia • Uganda • Russia
Brief report of inspection activities undertaken	
Scope and limitations	
Areas inspected	<p>Document reviewed including but not limited</p> <ul style="list-style-type: none"> • Organization Chart • Job descriptions for key personnel • Personnel training and hygiene • Product Quality Review • Quality Risk Management • Responsibilities of the quality units and production • Complaints and Recalls • Deviation control and change control • CAPA procedure • OOS and investigation • Material release • Self-inspection and vendor qualification • Validation and qualification • Equipment calibration • Data integrity • Sampling and testing of materials • Batch processing records • Materials management system • Purified water system • HVAC

	Site visited: <ul style="list-style-type: none"> • Starting material warehouse • Production areas • QC laboratories including chemical and microbiological • Controlled samples and Documentation area • Stability chambers area
Restrictions	The inspection focused on storage, production and quality control areas where WHO Prequalified products were manufactured
Out of scope	Products not submitted to WHO for Prequalification
WHO product numbers covered by the inspection	Dosage form inspected: film coated tablets

Abbreviations	AHU	air handling unit
	ALCOA	attributable, legible, contemporaneous, original and accurate
	API	active pharmaceutical ingredient
	APQR	annual product quality review
	BDL	below detection limit
	BMR	batch manufacturing record
	BPR	batch packaging record
	CAPA	corrective actions and preventive actions
	CC	change control
	CFU	colony-forming unit
	CoA	certificate of analysis
	CpK	process capability index
	DQ	design qualification
	EM	environmental monitoring
	FAT	factory acceptance test
	FBD	fluid bed dryer
	FMEA	failure modes and effects analysis
	FPP	finished pharmaceutical product
	FTA	fault tree analysis
	FTIR	Fourier transform infrared spectrometer
	GC	gas chromatograph
	GMP	good manufacturing practice
	HACCP	hazard analysis and critical control points
	HPLC	high-performance liquid chromatograph
	HVAC	heating, ventilation and air conditioning
	IR	infrared spectrophotometer
	IQ	installation qualification
	KF	Karl Fisher
	LAF	laminar air flow
	LIMS	laboratory information management system
LoD	limit of detection	
LOD	loss on drying	
MB	microbiology	

MBL	microbiology laboratory
MF	master formulae
MR	management review
NMR	nuclear magnetic resonance spectroscopy
NRA	national regulatory agency
OQ	operational qualification
PHA	process hazard analysis
PM	preventive maintenance
PpK	process performance index
PQ	performance qualification
PQR	product quality review
PQS	pharmaceutical quality system
QA	quality assurance
QC	quality control
QCL	quality control laboratory
QRM	quality risk management
RA	risk assessment
RCA	root cause analysis
SOP	standard operating procedure
TAMC	total aerobic microbial count
TFC	total fungi count
TLC	thin layer chromatography
URS	user requirements specifications
UV	ultraviolet-visible spectrophotometer

Part 2
Brief summary of the findings and comments
1. Pharmaceutical quality system

A pharmaceutical quality system (PQS) was established, with a Quality Manual and written procedures covering essential GMP principles for the site. A Quality Manual was available and was briefly reviewed. It was established based on ISO 9001:2008 and it adequately described the main principles of the standard. The company should take into consideration the revision of ISO 9001 as well as concepts applicable to PQS. Management review meetings were held monthly, quarterly and annually. Procedures that were reviewed and discussed during the inspection were generally presented promptly.

Product quality review (PQR)

A PQR procedure was in place describing the steps to verify consistency of existing processes, appropriateness of established specifications for starting materials, in process and finished products as well as monitoring trends. QA personnel were responsible for compiling PQRs and all PQRs had to be completed by the end of March, each year. Head QA was responsible for approving PQRs. It was noted that PQRs did not include a review of batches of excipients and packaging materials used in each product. Similarly OOT was not included in the PQR but a separate annual report was compiled. The company was performing separate reviews of each one of the excipients and packaging material used during the previous year but these reviews were not associated with the PQR. Process capability and process capability index were used for performing statistical analysis on assay and yield while 3 sigma were calculated for parameters such as dissolution and tablet hardness. Low and upper specification limits were used for the calculations since a small number of batches of the WHO Prequalified product had been manufactured

Quality Risk Management (QRM)

A QRM procedure was presented and it adequately described the basic concepts of a systematic approach to evaluate risks in manufacturing operations of medicinal products. Head QA was responsible for coordinating QRM across various functions and departments of the organization. FMEA was identified as the main tool for risk assessment. It was noted that QRM principles were not applied in vendor qualification activities. It is recommended that the company focuses on the application of QRM principles.

Change and deviation management

A procedure on change control was presented. The company initiated a facility expansion in 2015 which was completed in 2017 and it affected the whole building. New production areas were introduced. Six new AHUs were installed and three user points were introduced in the purified water loop. Spot checks on clean room classification and qualification were performed. PW system was reviewed as well as equipment qualification. It was noted that changes were introduced in a step wise approach but some of the documents generated during the implementation of these changes (e.g. annual report) were not foreseen by the relevant procedure.

The company defined as deviation any planned event not meeting the established procedures, standards and limits. Deviations were categorized as critical, major and minor following a risk assessment. According to the relevant procedure deviations had to be closed out within 30 working days from the day of approval. Head QA was responsible for monitoring, evaluating, and closing out deviations. The procedure included appropriate instructions for identifying and investigating recurrent deviations. Two types of deviation logbooks were maintained. The first logbook was used for general deviations while the second one was dedicated to product deviations and there was one such logbook per product. 2016 and 2017 deviation registers were presented and reviewed.

The procedure on reporting, investigating and closing out incidents was also reviewed. The company defined as incident any unforeseen event. Similarly to deviations two types of logbooks were available

CAPA management

CAPA were identified for deviations, incidents, OOS, OOT and complaints. Implementation deadlines were set and in general monitored. However it was noted that CAPA were not always reviewed in case of recurrence.

Investigation of Out Of Specification

OOS investigations were performed according to a defined procedure which was used for both chemical and microbiological testing. OOS investigations were checked during PQR review and during laboratories visit.

2. Good manufacturing practices for pharmaceutical products

Basic principles of good manufacturing practices were generally described, and implemented. Manufacturing processes were defined and documented, though in certain cases with inadequate detail in BMRs and BPRs. Required resources were generally provided, including adequate premises, equipment and utilities. Appropriately qualified personnel were employed. In general the surfaces were smooth and free from cracks. Equipment and materials were orderly positioned to minimize the risk of confusion between different pharmaceutical products or their components. Temperature and relative humidity and were monitored. Manometers were installed and differential pressure was checked and recorded where appropriate. The oral solid dosage form production areas were inspected.

3. Sanitation and hygiene

Premises and equipment were generally maintained at an acceptable level of cleanliness and they were appropriately labelled. Nevertheless in certain occasions cleaning materials were not placed in close proximity of the area where cleaning was performed. The company had in place standard operating procedures as the basis for its approach to personal hygiene and sanitation in its production facility

4. Qualification and validation

The key principles of qualification and validation program were defined and documented in the Validation Master Plan. This was a standalone document containing details on all validation/qualification activities including but not limited to equipment, utilities, processes and cleaning. Process validation procedure adequately described the principles of process design, process qualification and continued process verification.

Cleaning validation procedure and protocol were reviewed. Cleaning validation was carried out per production line; this had as a result that some common tools and equipment not to be included in the cleaning validation protocol and report. Minimum and maximum acceptable daily doses as well as NOAEL levels were provided from R&D department. Approved templates were used and all relevant documentation was appropriately archived.

Qualification of six newly installed AHUs and relevant rooms which was carried out in accordance with a defined procedure. AHUs were equipped with 10 micron, 5 micron filters followed by 0.3micron plenum HEPA filters and 0.3 micron terminal HEPA filters. 90% of the air was recirculated. Non-viable particles, air velocity, air changes, differential pressure, temperature and relative humidity were qualified annually. Recovery test, air flow pattern studies and filter integrity test were performed every 24 months.

Temperature mapping of the warehouse was carried out for 72 hours during each of the three seasons which were identified as the worst case scenario. The duration of this exercise was not appropriately justified

5. Complaints

The company had in place a procedure on registering, investigating and monitoring complaints. QA Head was responsible for the overview of complaint handling. Department heads were responsible for performing investigations which had to be completed within 30 days. Complaints were reviewed quarterly. 2016 and 2017 complaints were spot-checked.

6. Product recalls

A procedure on product recall was available. The urgency of recall notification was not appropriately defined in the procedure. Effectiveness of recall arrangements was evaluated yearly. The 2017 mock recall was reviewed.

7. Contract production, analysis and other activities

The company used eight third party laboratories and four MSN laboratories for performing certain tests on APIs, excipients and FPPs. Contracts with external laboratories were established. The company also contracted certain service providers for performing qualification and calibration activities but there was no procedure in place defining the criteria and conditions for establishing such technical agreements.

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

Records of self-inspection were available but were not reviewed in detail. A procedure on vendor qualification was presented and a separate procedure on evaluating and certifying contract laboratories was also available. Audits were conducted before a contract was established. Suppliers were yearly evaluated.

Contract laboratories were also audited before contracts were established and a re-evaluation was performed every 3 years.

9. Personnel

Organization charts were available for each department. A procedure was in place describing the basic concepts for establishing organigrams and job descriptions. Job descriptions of the production manager, QA manager and Warehouse manager were reviewed. In general, personnel met during the inspection appeared aware of the GMP principles.

10. Training

A training procedure was in place, providing instructions for organizing and conducting training to new and existing personnel of all departments. It also defined the responsibilities of trainers and trainees and a specific section was dedicated to training of temporary personnel. An annual training plan was presented. Training sessions were evaluated and records were maintained.

11. Personal hygiene

Personnel gowning procedure was appropriate and was generally followed. Instructions and pictorials to be followed were sufficiently clear when it came to personal hygiene. There was a procedure in place for medical examination. Spot checks on medical records of personnel were performed. It was noted that contract personnel was not undergoing the same extent of medical examinations as permanent personnel.

12. Premises

In general, facilities used for manufacture and quality control were designed and constructed to facilitate proper cleaning, maintenance and production operations. Premises were designed to ensure the logical flow of materials and personnel. A new in-process laboratory was constructed in the production block. Quality control laboratories were separated from production areas. Sufficient space was given to avoid mix-ups and cross-contamination. Storage areas for warehousing of raw materials and finished product were of sufficient capacity. Temperature and humidity were monitored twice daily. Two data loggers were placed on hot spots which were identified during the temperature mapping exercise. Receiving and dispatch bays were separated and were protected from weather conditions. A dedicated area for rejected materials was available and it was segregated. There was a separate entry and change rooms for visitors. Hand washing basins were not available and visitors were requested to sanitize their hands with sanitization solution. It was recommended to the company to install hand washing basins in the visitors' change room. There were separate areas for sampling and dispensing excipients and APIs. Sampling of packaging material took place in a mobile LAF in the warehouse. New granulation and compression areas became operational in 2017. It was noted that differential pressure was not appropriately monitored in certain production areas.

13. Equipment

In general, equipment was appropriate for the manufacture of solid dosage forms. Records for calibration, qualification and maintenance were available. Punches and dies were not dedicated. FBD filter bags were molecule dedicated and they were appropriately labeled.

Due to an extension of the PW distribution system three new user points were introduced. Qualification of the system took place during 25-31 October 2016 and the report was approved on 14 November 2016. Qualification documentation was reviewed as well as the monitoring report. Some discrepancies regarding sampling operations were identified.

14. Materials

There was a procedure in place describing receipt and storage of raw materials. A check list was used for receipt of raw materials. A controlled copy of approved vendors was available at raw material receipt area. Material stock and status were managed manually and warehouse locations were assigned and recorded in logbooks.

15. Documentation

A documentation system was in place. The Quality Manual acted as an umbrella covering the basic quality principles and procedures defining and supporting manufacturing and quality control operations. Documentation was categorized in four levels according to criticality. Although SMF was considered part of the documentation it was not categorized. In general documents were approved, signed and dated by appropriate responsible persons, reviewed and kept up to date. Specifications and testing procedures were available. Some discrepancies in distribution of documents were identified.

16. Good practices in production

A visit to production areas was made. Dispensed materials were transferred to production areas in labeled HDPE container according to a defined procedure. Areas inspected included the dispensing areas, granulation, compression rooms, coating rooms and primary and secondary packaging areas. Molecule dedicated FBD filter bags were used and they were appropriately marked and stored. There was a procedure available for setup, operation and cleaning of the compression machine. BMRs and BPRs of batches being manufactured during the tour were spot checked as well as maintenance and calibration of equipment.

17. Good practices in quality control

Quality control laboratories were separated from production areas. Both chemical and microbiological laboratories were visited as well as the separate area where stability chambers were installed. Receipt and allocation of samples followed established procedures and were documented. The company had made progress since the last WHO inspection on implementing measures that would safeguard data. There were 18 standalone HPLCs and there were some limitations on ensuring data integrity. Review of audit trails was performed monthly and quarterly. Analysts had the right to change integration parameters and perform integration more than once before locking the sequence. An audit trail was created in such cases and it had to be reviewed by the supervisor. The supervisor had also privileges to change integration parameters and perform re-integration subject to approval from QC head. Similarly audit trails were created in such cases. The company had already recognized the shortfall of standalone laboratory equipment and it was in process of installing new software and back up data to a server. Results of the stability studies were reviewed.

Growth promotion tests of nutrient media were performed at the time of receipt by preparing six standard micro-organisms according to the relevant procedure. Prepared media had to be used within 15 days according to the relevant procedure. Total microbial count tests of tablets were carried out in accordance with a defined procedure.

Part 3: Conclusion

Based on the areas inspected, the personnel met and the documents reviewed, and considering the findings of the inspection, including the deficiencies listed in the Inspection Report, as well as the Corrective Actions taken and planned, **MSN Laboratories Private Limited, Formulations Division, Plot No.: 42, Anrich Industrial Estate, Bollaram, Sangareddy District-502 325, Telangana, India** was considered to be operating at an acceptable level for compliance with WHO GMP guidelines.

All the non-conformances observed during the inspection that were listed in the full inspection report as well as those reflected in the WHO Public Inspection Report (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 GMP guidelines used for assessing compliance

1. 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
2. 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.
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_986/en/
Short name: WHO TRS No. 986, Annex 2
3. 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
<http://www.who.int/medicines/publications/44threport/en/>
4. 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/
5. 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

6. WHO guidelines on good manufacturing practices for heating, ventilation and air-conditioning systems for non-sterile pharmaceutical dosage forms. *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fifth Report* Geneva, World Health Organization, 2011 (WHO Technical Report Series, No. 961), Annex 5
Short name: WHO TRS No. 961, Annex 5
http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf?ua=1
7. 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
8. WHO Good Practices for Pharmaceutical 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. 957, Annex 1
<http://www.who.int/medicines/publications/44threport/en/>
9. 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/>
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 artemisinin is used as a starting material in the prosecution 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. WHO good manufacturing practices for biological products. *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fiftieth Report* Geneva, World Health Organization, 2016 (WHO Technical Report Series, No. 996), Annex 3

Short name: WHO TRS No. 996, Annex 3

http://www.who.int/medicines/publications/pharmprep/WHO_TRS_996_annex03.pdf

22. 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 TRS No. 996, Annex 5

http://www.who.int/medicines/publications/pharmprep/WHO_TRS_996_annex05.pdf

23. 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