

Prequalification Team Inspection services
WHO PUBLIC INSPECTION REPORT
(WHOPIR)
Active Pharmaceutical Ingredient Manufacturer

Part 1	General information
Manufacturers details	
Name of manufacturer	Saurav Chemicals Limited
Corporate address of manufacturer	Plot No. 370, Industrial Area, Phase-II, Panchkula, Haryana State, India, Pin - 134109
Inspected site	
Name & address of inspected manufacturing site if different from that given above	Saurav Chemicals Limited Derabassi-Barwala Road, Village Bhagwanpura, Tehsil Derabassi, District Sahibzada Ajit Singh Nagar, Punjab, 140 507, India
Synthetic unit /Block/ Workshop	Pharma II and Pressure vessel block
Inspection details	
Dates of inspection	21-24 October 2019
Type of inspection	Routine Inspection
Introduction	
Brief description of the manufacturing activities	Manufacturing and quality control of APIs and intermediates.
General information about the company and site	Saurav Chemicals Limited is a joint venture company headquartered in Panchkula (Haryana) that manufactures active pharmaceutical ingredients (APIs) and intermediates. There were several pharma blocks at the inspected site as well as several buildings housing utilities, quality control, warehouse and administration. Among these blocks, Pharma II and Pressure Vessel Block were used for manufacturing of the API, Diethylcarbamazine Citrate (DEC). These blocks were not dedicated to DEC production. The WHO grade of DEC API was released complying to one of two specifications: USP and WHO (in house). Penicillin and other β-lactam products, cytotoxic or other high potent materials were not manufactured at this site as confirmed by the company. The number of personnel employed by the site was 507 at the time of the inspection.

History	This was the third WHO PQ inspection. The last WHO inspection was performed 22-28 February 2016. The site was periodically inspected by local authorities, and it has been inspected by US FDA in March 2018 and PMDA in May 2019 with a positive outcome. However, the inspection scope in terms of facilities and APIs were different from the WHO planned inspection.
Brief report of inspection activities undertaken – Scope and limitations	
Areas inspected	The inspection covered the following areas: ▪Quality management ▪Personnel ▪Buildings and facilities ▪Process equipment ▪Documentation and records ▪Materials management ▪Production and in-process controls ▪Packaging and identification labelling of APIs and intermediates ▪Storage and distribution ▪Laboratory controls ▪Validation ▪Change control ▪Rejection and reuse of materials ▪Complaints and recalls ▪Contract manufacturers (including laboratories) ▪Implementation of CAPAs as result if the previous WHO inspection Site areas visited: ▪Workshop: Pharma II ▪QC laboratories ▪Warehouses ▪DI water system
Restrictions	None
Out of scope	The APIs out of the scope of the WHO PQ were not covered.
WHO APIs covered by the inspection	Diethylcarbamazine Citrate (APIMF216)
Abbreviations	Meaning
AHU	Air handling unit
ALCOA	Attributable, legible, contemporaneous, original and accurate
API	Active pharmaceutical ingredient
APR	Annual product review
BMR	Batch manufacturing record
BPR	Batch production record
CC	Change control

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
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
KF	Karl Fisher
LAF	Laminar air flow
LIMS	Laboratory information management system
MB	Microbiology
MBL	Microbiology laboratory
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
RH	Relative humidity
RO	Reverse osmosis
SMF	Site master file
SOP	Standard operating procedure
URS	User requirements specifications
UV	Ultraviolet-visible spectrophotometer

Part 2	Summary of the findings and comments (where applicable)
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1. Quality management

A formal documented system of quality management was established, with procedures covering key quality elements being in place. Operations were specified in written form and GMP requirements were essentially being met. Organizational structure chart was available. The quality Unit was divided into QA and QC departments, which were independent of production. API products were released by authorized persons.

Product quality review (PQR)

PQRs were performed annually according to the SOP for “Annual product review”. The company’s QA Head and Unit Head were authorized to approve PQR reports.

The Diethylcarbamazine Citrate PQRs of 2016, 2017 and 2018 were reviewed. It was concluded that the manufacturing process of Diethylcarbamazine Citrate was consistent in yield, quality and stability. Non-compliances observed during the inspection were listed in the full report regarding the PQR. These were addressed by the manufacturer to a satisfactory level.

Quality risk management (QRM)

QRM is performed according to the SOP “Risk assessment and classification of quality related events”. Risk assessment report for factors leading to generation of elementary impurities (EIs) in production of DEC approved in 2017 was reviewed. EI validation report and testing data spot checked was found acceptable.

Deviation and CAPA

The procedure for handling of deviation and the procedure for root cause analysis and tracking of CAPAs were reviewed and discussed.

Internal audits (self-inspection)

A procedure for self-inspection was in place. This SOP describes the audit team, documentation (report) frequency of self-inspection and strategy of self-inspection. Self-inspections were conducted according to approved schedule. The company presented the list of approved auditors.

2. Personnel

Some key personnel including the Corporate QA head, site head of QA and head of QC joined company after the last inspection. Personnel met during the inspection appeared to have adequate knowledge and experience of GMPs.

The SOP for “Job description” was in place. According to the SOP “List of authorized people for batch release”, the persons authorized for batch release were specified. The job description reviewed of Quality Head, Head QA and Manager QA, Deputy Manager QA, and Head QC was acceptable.

Training

The procedure for training and the following documents were reviewed during the inspection and found acceptable in general.

- The training schedule in 2019
- Training record of SOP for Annual product review.
- Training record of ICH Q8 in April 2019.
- Training documents for HVAC system and DI water system

Personnel hygiene

Personnel were required to wear protective clothing suitable for the type and stage of manufacturing. Sanitation and change room facilities were available. Smoking, drinking and eating were not permitted in manufacturing areas. Any person shown to have an apparent illness or open lesions were rejected to engage in activities.

3. Buildings and facilities

Some facilities e.g. FG warehouse, R&D department and several production blocks have been added on this site since last inspection. The production of DEC API was taken place at production block Pharma II and Pressure Vessel block which was not dedicated to Diethylcarbamazine Citrate (DEC) APIs production. The manufacturing facilities were shared by different APIs. Manufacturing areas were generally designed, and constructed to facilitate cleaning, maintenance and operations at acceptable level.

Water system

Deionized water (DI water) system was inspected. The source water is bore hole water. The DI water was made by double RO followed by EDI. The DI water system was regularly sanitized. The quality of DI water was monitored by sampling from critical points and use points and the testing. The specification of DI water was documented. The annual review report of DI water system in 2018 showed that the system worked well.

HVAC system

A dedicated HVAC system provided filtered air to Pharma II Grade D area used for final manufacturing processes for DEC API products. A revalidation report of the HVAC system briefly reviewed showed it worked well.

4. Process equipment

The equipment in the Pharm II and Vessel block used for DEC API production were not dedicated. The equipment used was of appropriate design and adequate size for its intended use. Labels were attached to the equipment with information of the equipment identification number, clean status, qualification status and due date.

Equipment cleaning

The production of DEC API was organized and performed as campaign based. The methods used in equipment cleaning included batch to batch cleaning and complete cleaning when product change over. Non-compliances observed during the inspection were listed in the full report regarding equipment cleaning. These were addressed by the manufacturer to a satisfactory level.

Equipment calibration and maintenance

The SOP “Calibration of plant instruments”, SOP “Preventing maintenance equipment” and SOP ‘Maintenance and calibration of laboratory equipment /instruments” were in place and reviewed. Frequency of instrument calibration was specified in the procedure. The “Annual calibration schedule” prepared for 2019 was attached to the Validation Master Plan. The instrument calibration and equipment maintenance reviewed showed that the procedure was followed.

Computerized systems

A computerized system was used in QC lab. The HPLC and GC instrument was network in the system.

The computerized system was managed according to an SOP. The computerized system configuration, risk assessment and qualification report were checked and found generally acceptable. Weakness regarding observed during the inspection were listed in the full report the computer system revalidation. These were addressed by the manufacturer to a satisfactory level.

5. Documentation and records

The documentation system was generally well established. A table with full revision history was included in each procedure and documents. Documents related to the GMP are prepared, reviewed, approved and distributed according to written procedures. Generally, the documents were on paper-based. The format and the scope of SOP and numbering system of SOP were established.

Batch numbering system

An SOP for batch numbering system and a logbook to keep the batch history was reviewed and found acceptable.

6. Materials management

Warehouses including storage areas for solid materials, liquid materials and solvent tank farm were visited during inspection. Rejected and returned product area were segregated and secured. There were written procedures which described the receipt, identification, quarantine, storage, handling, sampling, testing and approval or rejection of materials.

An approved vendor list was available in warehouse. Stock control was performed manually. Non-compliances observed during the inspection were listed in the full report regarding material code management. These were addressed by the manufacturer to a satisfactory level.

The following SOP documents were briefly reviewed and discussed:

- Receipt and storage of all incoming raw materials and packing materials.
- Sampling, approval or rejection of raw materials.
- Issuance/dispensing of raw materials and packing materials.
- Vendor qualification of material suppliers.
- A supplier audit report and the quality agreement.

7. Production and in-process controls

Production operations for Diethylcarbamazine Citrate were in operation at Pharm II at the time of inspection. DEC production were performed according to instructions in the BMR. Blending operation generally was not performed for the WHO grade of DEC API as stated by the company. Final purification, crystallization, drying and packaging was performed in a Grade D clean area.

The BMR checked in the production area showed it had been kept up to date. Non-compliance observed during the inspection listed in the full report regarding material charging quantity verification has been addressed by the manufacturer to a satisfactory level.

In-process sampling and controls

In-process sampling was performed at defined stages. Testing of all in-process samples is performed in QC laboratory.

Contamination control

A closed system was used for material transfers from chemical area to the Grade D area. The centrifuge bags used for DEC processing the were dedicated and labeled. The logbook for use and cleaning of DEC centrifuge bags was presented and found acceptable.

8. Packaging and identification labelling of APIs and intermediates

A brief inspection of Pharma II packaging area was undertaken. Packaging was not in operation at the time of inspection. The cleaning of the secondary packaging material entering the grade D area was checked and discussed.

9. Storage and distribution

During inspection of the warehouse, materials were found to be stored under appropriate conditions. The monitoring records of the warehouse conditions including temperature and humidity were maintained. The area was temperature controlled, had been temperature mapped and a report was available. Separate storage areas for quarantined, rejected, returned or recalled materials were available and secured.

The Finished product release and distribution areas were inspected, and the following procedures were reviewed:

- SOP for finished product stock maintenance and their distribution
- SOP for sampling, testing release and storage of in-process and intermediate materials
- SOP for approval and release of finished products.
- Batch release of DEC API products.

Non-compliances observed during the inspection were listed in the full report regarding material/product code management. These has been addressed by the manufacturer to a satisfactory level.

10. Laboratory controls

The QC laboratories were responsible for physical, chemical testing of starting materials, packaging materials, intermediates, finish APIs. The Microbiological laboratory was to test API, environmental monitoring samples and DI water samples and samples from cleaning validation.

Sample receiving and distribution

The procedure for sample receiving and distribution procedures and the sample register was available and reviewed. No observation was made.

Out of Specification (OOS) and Out of Trend (OOT) results

The procedure for management of OOS and OOT results was reviewed. An OOS/OOT log book was kept. Trending of OOS/OOT results was evaluated according to the SOP for quality management review.

The OOS/OOT register in 2018 and 2019 was checked. The investigation of DEC API in 2018 was reviewed and discussed. Non-compliances observed during the inspection were listed in the full report regarding OOS investigation. These were addressed by the manufacturer to a satisfactory level.

Reference standards

Primary reference substance and the secondary working reference substance for DEC testing was available and documented. A usage log book was kept.

Stability monitoring of APIs

Stability studies followed the procedure and requirements described in an SOP. The DEC samples were placed under condition of 30°C/75% for ongoing stability study.

The facilities and chambers for stability study was inspected and found acceptable. An alarm system was in place. Temperature and related humidity were monitored online and was checked daily.

Reserve/retention samples

The procedure for reserve samples management was reviewed. Reserve samples were stored in a designated temperature-controlled room in QC laboratory. A logbook was in place. API samples from each of every batch produced was retained according to the SOP.

Testing of intermediates and APIs

Intermediates and finished API specifications for DEC was documented. The specification and test procedure for WHO grade of DEC API was checked and found acceptable.

Laboratory equipment

The analytical equipment was well equipped with acceptable standards. The HPLCs and GC located in the QC laboratory were connected with software. Usage logs were available for instruments. The logs for IR spectrometer, audit trail data in a HPLC and the access control to the computerized system was checked and found acceptable. Preventative maintenance of all analytical instruments was described in an SOP and was acceptable.

Microbiology laboratory

There was a dedicated area for the microbiology laboratory in QC area. All microbiological tests of the APIs, DI water, samples for cleaning validation and environmental monitoring of microorganisms was conducted by the laboratory. In addition, TOC analysis was carried out in the Microbiological Laboratory (separate room).

Raw data of the microbiological tests of deionized water from a specified sampling point was reviewed. The required tests and verifications were performed, and all results fulfilled the acceptance criteria.

The SOP concerning growth promotion tests “Growth promotion test” and the SOP concerning culture media preparation “Preparation and Sterilization of Microbial Culture Media” were in place.

Non-compliances observed during the inspection were listed in the full report regarding microbiology laboratory facility. These were addressed by the manufacturer to a satisfactory level.

11. Validation

The SOP “Process validation” was in place. An approved validation master plan was available.

Process Validation

A Process validation report for DEC approved in 2019 was checked. It was concluded that a specified DEC manufacturing process in the validation was meeting the predetermined specification in terms of all yield and quality parameters in a consistent manner and the process is stand validated.

Furthermore, as per SOP “Process validation”, the continuous process verification for the whole manufacturing process of DEC was prepared. It was concluded that based on the overall review, executed process /equipment was able to deliver consistent quality and yield of Diethyl Carbamazine Citrate. Hence no revalidation/requalification was proposed.

The schedule of the requalification and maintenance of production equipment, utilities were enclosed to the VMP. Maintenance and qualification of QC equipment and unities were carried out separately. The schedule of the requalification and maintenance for QC was documented.

Cleaning validation

Cleaning validation followed the principles described in an SOP for cleaning validation. The cleaning validation protocol and report for DEC was reviewed and discussed.

Analytical method validation

Analytical method validation followed the principles described in an SOP. A compendia method (USP and EP) was used for testing of WHO grade of DEC API except for residue solvent. The analytical methods of related substance (HPLC), assay and residue solvent for WHO API were validated. The analytical method validation for cleaning samples were briefly reviewed. No observation was made.

12. Change control

Change control were managed according to an SOP. Changes were classified as major and minor according to the procedure. Some changes made since last inspection related to the site and products as well as to the DEC manufacturing process was reviewed. No observation was made.

13. Rejection and re-use of materials

Reprocessing and reworking of finished APIs or intermediates was managed according to an SOP. The reprocessing of some DEC batches was reviewed and discussed. The reprocess batches were on hold at the time of inspection.

Solvents and mother liquids recovery were performed during process and managed according to an SOP.

14. Complaints and recalls

The recall was managed according to the SOP “Product batch recall”. The company stated that there has been no batch recall of Diethylcarbamazine Citrate in the last three years.

Mock recall was required to be performed according to the SOP. “Report for mock recall” showed that the most recent "mock recall" was performed in 2018.

Complaints were managed according to the SOP “Handling of market complaints”. According to the procedure, it was the responsibility of the QA manager in coordination with other departments for the investigation of complaints. The procedure detailed the receipt and logging of complaints, investigation, timeline and CAPA.

Complaint’s log books form 2017 - 2019 was checked. The investigation of complaint concerning Diethylcarbamazine Citrate was reviewed. No observation was made.

15. Contract manufacturers (including laboratories)

No manufacture or routine QC testing was contracted out; however, some testing was contracted out. The technical agreement was not reviewed in this inspection.

Part 3	Conclusion – Inspection outcome
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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, **Saurav Chemicals Limited** located at **Village Bhagwanpura, Tehsil Derabassi, District Sahibzada Ajit Singh Nagar, Punjab, India**, for the manufacturing of the API, **Diethylcarbamazine Citrate (APIMF216)** was considered to be operating at an acceptable level of compliance with WHO GMP Guidelines for APIs.

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 GMP Guidelines referenced in the inspection report
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1. 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 WHO TRS No. 957, Annex 2**
<http://apps.who.int/medicinedocs/documents/s20119en/s20119en.pdf>
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. **Short name: WHO GMP or WHO TRS No. 986, Annex 2**
http://www.who.int/medicines/areas/quality_safety/quality_assurance/expert_committee/trs_986/en/
3. WHO good manufacturing practices: water for pharmaceutical use. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-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 HVAC Guidelines or 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 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 guidance 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 Multisource guidance or 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