EDA GMP public inspection report

Part 1	**General information**
Manufacturers details	
Company information	
Name of manufacturer	Beijing Minhai *Biotechnology* Co., Ltd
Inspected site	
Address of inspected manufacturing site	*No. 35, Simiao Road, No. 25, Tianfu Road, Bioengineering & Pharmaceutical Industrial Park, Zhongguancun Science Park, Daxing District, Beijing, P.R. CHINA* zhenghaifa@biominhai.com niexiaoqi@biominhai.com
Inspection details	
Dates of inspection	*From 09-12-2024* *To 13-12-2024*
Type of inspection	*This is a pre-approval overseas, product- focused and announced inspection*
Introduction	
General information about the company and site	*Production activities: Preventive biological products, including Diphtheria, Tetanus, Acellular Pertussis and Haemophilus Influenzae Type b Combined Vaccine, Haemophilus Influenzae Type b Conjugate Vaccine, Haemophilus Influenzae Type b Conjugate Vaccine (prefilled), 23-valent Pneumococcal Polysaccharide Vaccine, Haemophilus Influenzae Type b Conjugate Vaccine, Freeze-dried, Diphtheria, Tetanus and Acellular Pertussis Combined Vaccine, Adsorbed, Group ACYW135 Meningococcal Polysaccharide Vaccine, 13-valent Pneumococcal Polysaccharide Conjugate Vaccine (TT/DT), Rabies Vaccine (Human Diploid Cell) for Human Use, Freeze-dried, and Varicella Vaccine, Live, Diphtheria, Tetanus and Acellular Pertussis (Component) Combined Vaccine, Poliomyelitis Vaccine (Vero cell), Inactivated, Sabin Strains. In addition to the production activities within the scope of drug manufacture license, this production site also conducts vaccine research and development.*
Brief report on inspection activities undertaken	
Scope and limitations	
Areas inspected	• *13-Valent Pneumococcal Polysaccharide Conjugate Vaccine bulk building #2B Workshop* • *F5 Filling Line for Pre-filled syringe building #3B* • *Packaging area* • *QC laboratories* • *Utilities buildings (water station, HVAC system)* • *warehouse (FP &raw materials warehouse).*
Restrictions	*None*

Out of scope	*None*
Inspected biological product	*The inspection activities focused on 13-valent Pneumococcal Polysaccharide Conjugate Vaccine (TT/DT) (under marketing authorization approval)*
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*
CPP	*Critical Process Parameter*
CQA	*Critical Quality Attribute*
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

1.1 Management review

To ensure compliance with the quality requirements based on the rules of cGMP, the company developed and implemented the Quality Management System based on current Good Manufacturing Practice according to national and international standards. as well as Good Laboratory Practices (GLP)and Good Storage Practices (GSP) to meet the requirements of cGMP guidelines and to ensure that products are consistently produced and controlled according to the quality standard appropriate for their intended use and as required by the marketing authorization.

Product quality review

Quality reviews of all products conducted annually to verify the consistency of existing process and appropriateness of current specifications for both starting materials and finished products. Many reviews were conducted and documented considering reviews and suitable assessments and CAPA were taken. APQR SMP was reviewed and included the following: Product composition description, Batch information, Raw Materials, Facilities Review, Change Control (CC), Deviations, Out of Specification (OOS), Reprocessed/Rejected, Release status, Stability Studies, Complaint, Returned and Recalls, Corrective and Preventive Action (CAPA), Review of previous APQR, Conclusion and Recommendation., And some Deficiencies were raised.

1.3 Quality risk management

During the inspection, the company Quality Risk Management (QRM) system was reviewed to evaluate its effectiveness in identifying, assessing, controlling, communicating, and monitoring risks that could affect product quality and patient safety. The review found that the organization has implemented an effective risk management process, applying appropriate risk assessment and risk control tools, including risk matrices, Failure Mode and Effects Analysis (FMEA), risk ranking, trend analysis, and periodic risk reviews. These tools are used to identify potential risks, evaluate their impact and likelihood, implement suitable mitigation measures, and monitor the effectiveness of controls. Based on the evidence reviewed, the Quality Risk Management system was found to be operating at an acceptable level, with adequate controls in place to manage identified risks and support continual improvement in compliance with applicable quality standards.

1.4 Deviation management

The handling of deviation was following a written approved procedure according to SMP describe the methodology of monitoring & reporting of any deviation as well as the action taken for investigation, corrective and preventive actions. Some deviations were reviewed during inspection; there was no major deviation found in the APQR 2023.

1.5 Control change

The Change control handling was conducted according to a written approved procedure according to Change control, describe how to deal with relevant changes. many changes implemented were reviewed during inspection and found to be satisfactory.

1.6 Complaints

The site reviews drug complaints regularly to identify the potential quality and safety hazards in a timely manner. For the potential product quality issues that may exist, corresponding activities are carried out to prevent to recurrence of similar cases. The handling of the complaint and all the relevant documents were reviewed and found satisfactory, such as sop for handling of complaint.

1.7 Product recall

This site has established drug recall management system governing by SOP for recall system controlled with time frame which specify the investigation and assessment of quality issues which were the reason of the recall and the development of the recall process also responsibility was detected in SOP. mock recall was found in place to regulate the drug simulation recall procedure, during inspection mock recall report was reviewed, generally, the recall system was found to be satisfactory.

1.8 Self-inspection and CAPA management

Perform the self-inspection as per established self-inspection plan and take CAPA for defects and risk. The designated personnel shall track and evaluate the effectiveness of CAPA to ensure that SEDICO could consistently manufacture products by approval manufacturing process and comply with national standards and registration specifications.

1.9 Quality audits and supplier's audit and approval

The system was found satisfactory starting from planning for the audit and thoroughly during conduction, reporting, communication and follow up of the internal audit findings and finally by achieving effective CAPA system checked depending on SOP for Internal audits
The supplier qualification procedures were in place and were effective.

1.10 Personnel

Organization organogram

Responsibilities of key personnel were described in job descriptions in clear manners. Many job descriptions and related documents reviewed during inspection were well prepared

Training and qualifications

Training was conducted according to written procedure. Training conducted through TMS system, TMS administrator open the training account for new employee, training program conducted according to 3 levels depending on responsibilities assigned to him. training activities were recorded and evaluated and records maintained properly. several training records were shared and reviewed during inspection, and the system was found implemented effectively.

Personal hygiene

There was SOP for personnel hygiene management which describe the gowning procedures for class(A,B,C,D)the gowning for class A should cover hair, beard, overall suit, goggles, facemask .in addition to the health check for new employee in addition to the requalification of ascetic process

operators which was done every year. Different hygiene programs were established and adapted to different needs of the facility. Gowning in different stages was found adequate according to the zone and the activities to be performed comprehensive gowning procedures were found in place with witnessed implementation, And A deficiency was raised.

1.11Documentation

The documentation system was in place and documents required for quality management were controlled through SMP & data and record management procedure SMP. There was a system as well for reviewing the documents periodically, all the documents were well controlled, however some deficiencies were raised.

1.12 Batch release process

SOP for batch release was well prepared and effectivelly implemented.QA assures the quality of the product by sampling and analysis of in process and final product beside review of all the relevant manufacturing records throughout the production life cycle till product release.

2. Production

2.1 Drug substance

After arrival of the materials, check and accept the materials, and store as per the requirements of storage conditions of materials, sample under the same production condition, after the assay is approved, releasing materials is decided by QA finally. The qualified and approval materials for releasing shall be moved to qualified products area for storage.
All materials are well managed & identified, SOPs for handling materials were reviewed

2.2 Fill and finishing operations

Generally, fill and finishing operations were in accepted level of compliance.

2.3 Visual inspection

Related SOP was reviewed, and deficiency was raised.

2.4 Process validation

Process validation in this site aims to verify that a manufacturing process, operated within established parameters, can consistently produce products that are suitable for their intended use and in accordance with the registration requirements, including initial validation, periodic re-validation, re-validation of change and continuous process verification.
Process validation protocol of 13-valent pneumococcal polysaccharides conjugate vaccine (TT-DT) Final product, Process validation report was reviewed, and some Deficiencies were raised.

2.5 Reprocessing
NA

2.6 Batch manufacturing record

All manufacturing process mentioned in details of master batch record included CQA and CPP and in process controls and number of Batch records were reviewed during inspection and found satisfactory.

3. Facilities and equipment system

3.1 Qualification and validation

Requalification and revalidation plan for minhai VMP was reviewed and was found that the key elements of a qualification and validation program of the company were found clearly defined and documented.

3.2 Calibration

All equipment items are calibrated/ validated before being placed into service.

3.3 Maintenance

Regarding maintenance, the engineering department was responsible for the execution of the maintenance activities for ensuring the consistency of the operation of all the systems, utilities and equipment.

Production lines were properly equipped and maintained, and relevant logbooks were kept in place. Manufacturing equipment was checked. equipment logbooks for production and cleaning were kept in place and were checked during inspection and were satisfactory.

3.4 Water system

The design of water system complied with the cGMP and the materials of piping, valves, tanks and supply system that may contact steam were made of stainless steel 316L. There was well qualified purified water system generation. Trend analysis for pw 2023 was reviewed for the filling line F5 there was a deviation was initiated and for this deviation was reviewed. The record for vent filter change and the integrity test form and the filter serial numbers for PW and for WFI were reviewed and found satisfactory.

3.5 HVAC

HVAC system performance qualification for F5 line filling area was reviewed and SMP for environmental monitoring in addition to the SMP -for requalification and evaluation period management procedure were reviewed in which the requalification for class B areas were done every 6 months which comply with the regulation in WHO guidelines.

All HVACs are equipped with automatic control systems (BMS), which are mainly composed of PLC, modules, temperature and humidity sensors, temperature sensors, pressure sensors, air volume sensors, differential pressure sensors, frequency converters, actuators, upper computers, communication cables, WinCC ware, etc. Through the logical control over the openings of the heating valve, surface cooling valve, air supply valve, air return valve and exhaust valve, and the startup and shutdown frequency of the supply fan, return fan and exhaust fan of the air conditioning system, the temperature, humidity, air volume, air speed, differential pressure and other critical parameters are effectively adjusted under the production mode or disinfection mode. Related documents were reviewed, and deficiencies were raised.

3.6 Aseptic process simulation

Aseptic processing simulation was adequately documented and processed. Most of related documents reviewed were clearly written and well implemented ,however deficiency was raised.

3.7 Cleaning validation

The cleaning methods of equipment, containers and instruments in direct contact with drugs are divided into automatic online cleaning and manual cleaning. The final rinsing water is water for injections, after cleaning, online sterilization or steam sterilization with a pulsating vacuum sterilizer shall be performed; to demonstrate the effectiveness of the cleaning procedure, 3 consecutive successful cycles are generally performed in the cleaning validation.

Cleaning validation requires that containers/equipment be validated for their cleaning effectiveness while meeting the maximum dirty equipment holding time (DEHT). Reasonably select sampling methods based on the cleaning method and structural characteristics of the container/equipment during cleaning validation. Sampling methods generally include rinsing sampling and wiping sampling, taking samples of the final rinsing water or container/equipment surface. The validation items for rinsing water generally include conductivity, pH, TOC, endotoxins, and microbial limits, while the validation items for wiping sampling generally include TOC. Cleaning validation protocol and report of F5 filling and formulation line of PCV13 respectively were reviewed and some

Deficiencies were raised.

3.8 Storage equipment

The cold storage facilities used for the storage of temperature-sensitive materials and products were inspected during the visit. Temperature mapping of the cold storage area designated for finished products was reviewed and found to be satisfactory. The qualification of the ultra-low temperature refrigerator used for the storage of the cell bacterial seed bank was also reviewed and found to be acceptable.

3.9 Computerized system

At present, the information management system of the company has been put into operation, including ERP, WMS, MES, SCADA, LIMS, QMS, DMS and TMS.). The list of computer systems in 2B workshop SMF was reviewed. These systems were checked during the inspection and the validation protocols and report for some of these systems such as (WMS) were checked and found satisfactory.

3.10 Environmental monitoring

There was environmental monitoring system for monitoring based on the area qualification and depends on the classification of different areas. Trend analysis for the EM for QC sterility test lab and deficiency was raised.

4. Laboratory control system

4.1Analytical method validation

A GMP inspection of the laboratory on the second-floor QC and in animal house was conducted. The QMS documentation system, including SOPs, forms, and records, was well-controlled and updated, however, deficiencies included uncontrolled gowning instructions in the second-floor QC area and missing risk assessments in several labs, posing contamination risks.

Despite well-organized laboratories with designated testing and storage areas preventing cross contamination and controlled environmental conditions, a lack of designated sample preparation areas was noted. Regarding the laboratory's equipment, it was generally well-qualified, calibrated, and maintained, concerns were raised regarding the qualification of the UV disinfectant sterilizer.

Laboratory staff possessed documented training on analytical techniques and equipment operation, aligned with job roles and well-maintained records; however, the number of tests required for analyst qualification in qualitative and quantitative testing needed to be added. Detailed SOPs for sample receipt, testing, and data recording showed compliance in randomly audited tests. However, missing steps were noted in SOP- (polysaccharide and conjugated antigen content determination) during witness tests.

4.2 Out of specifications

Processes for investigating OOS results were assessed. And found that the laboratory demonstrated a structured approach for OOS investigations, with root cause analysis and corrective actions documented

4.3 Reference standard

The system for the management of reference standards was reviewed during the inspection. Documented arrangements were in place for the receipt, identification, storage, qualification, use, and monitoring of reference standards, where applicable. The controls implemented were generally consistent with WHO Good Manufacturing Practices (GMP) requirements to ensure the suitability and traceability of reference standards used in quality control activities.

4.4 Animal house and testing facilities

Refer to point 4.1.
5. Material system *Materials include raw materials and excipients, packaging materials): After arrival of the materials, check and accept the materials according to clear SOP for receiving and then store as per the requirements of storage conditions of materials, sample take under the same condition of production condition, after the assay is approved, releasing materials is decided by QA finally. The qualified and approval materials for releasing shall be moved to qualified products area for storage.* *-All material checked during inspection found received from approved suppliers* *-All materials are well managed & identified, SOPs for handling material were reviewed and storage facility was well-organized.*
6. Packaging and labeling system *There were automated packaging system and including folding of inserts and printed cartons.and those processes done according to approved SOPs to minize risk of mix up were reviewed and found satisfactory.the qualification of the labelling machine was reviewed and found satisfactory. The qualification of the packaging machine was reviewed and found satisfactory.*

Part 3	**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, (Beijing Minhai Biotechnology Co., Ltd) Located at (Science Park, Daxing District, Beijing, P.R. CHINA), was considered to be operating at an acceptable level of compliance with WHO GMP guidelines as adopted by EDA for biological products.* • *All the non-compliances observed during the inspection that were listed in the full report as well as those reflected in the EDA GMP public inspection report, were addressed by the manufacturer, to a satisfactory level, prior to the publication of the EDA-PIR* • *This EDA- PIR will remain valid till next inspection up to maximum 3 years, as long as there is any warning or recall from SRA.*
Part 4	**List of GMP 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-eight Report Geneva, World Health Organization, 2014 **Short name:** ***WHO TRS No. 986, Annex 2*** https://www.who.int/publications/m/item/trs986-annex2 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 **Short name:** ***WHO TRS No. 957, Annex 2*** https://www.who.int/publications/m/item/annex-2-trs-957 3.WHO guidance on good practices for desk assessment of compliance with good manufacturing practices, good laboratory practices and good clinical practices for medical products regulatory decisions. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-second Report. Geneva, World Health Organization, 2018 **Short name:** ***WHO TRS 1010, Annex 9*** https://www.who.int/publications/m/item/trs1010-annex9

	4. WHO Good Manufacturing Practices: water for pharmaceutical use. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-fifth Report. Geneva, World Health Organization, 2021 **Short name:** ***WHO TRS No. 1033, Annex 3*** https://www.who.int/publications/m/item/annex-3-trs-1033 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 **Short name:** ***WHO TRS No. 929, Annex 4*** https://www.who.int/publications/m/item/annex-4-trs-929 6. WHO good practices for pharmaceutical quality control laboratories. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-fourth Report. Geneva, World Health Organization, 2010 **Short name:** ***WHO TRS No. 957, Annex 1*** https://www.who.int/publications/m/item/trs957-annex1 7.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 **Short name:** ***WHO TRS No. 957, Annex 3*** https://www.who.int/publications/m/item/trs957-annex3 8.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 **Short name:** ***WHO TRS No. 1010, Annex 8*** https://www.who.int/publications/m/item/Annex-8-trs-1010 9.Guidelines on heating, ventilation and air-conditioning systems for non-sterile pharmaceutical products. Part 2: Interpretation of Guidelines on heating, ventilation and air-conditionning systems for non-sterile pharmaceutical products. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Third Report Geneva, World Health Organization, 2018 **Short name: WHO TRS No. 1019, Annex 2** https://www.who.int/publications/m/item/trs1019-annex2 10. WHO guidelines on transfer of technology in pharmaceutical manufacturing WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Fifth Report Geneva, World Health Organization, 2022 **Short name:** ***WHO TRS No. 1044, Annex 4*** https://cdn.who.int/media/docs/default-source/medicines/norms-and-standards/guidelines/production/trs1044-annex4-technology-transfer-in-pharmaceutical-manufacturing.pdf

	11. WHO good manufacturing practices for sterile pharmaceutical products. Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Fifth Report Geneva, World Health Organization, 2022 (WHO Technical Report Series, No. 1044), Annex 4. **Short name: *WHO TRS No. 1044, Annex 2*** https://www.who.int/publications/m/item/trs1044-annex2 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 **Short name: *WHO TRS No. 943, Annex 3*** https://www.who.int/publications/m/item/trs943-annex3 13. WHO good practices for pharmaceutical microbiology laboratories. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-Fifth Report Geneva, World Health Organization, 2011 **Short name: *WHO TRS No. 961, Annex 2*** https://www.who.int/publications/m/item/trs961-annex2 14. WHO guidelines on quality risk management. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-Seventh Report Geneva, World Health Organization, 2013 **Short name: *WHO TRS No. 981, Annex 2*** https://www.who.int/publications/m/item/trs981-annex2 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 **Short name: *WHO TRS No. 981, Annex 3*** https://www.who.int/publications/m/item/annex-3-trs-981 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 **Short name: *WHO TRS No. 961, Annex 14*** https://www.who.int/publications/m/item/tr961-annex14 17. Good Manufacturing Practices: Guidelines on validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Third Report Geneva, World Health Organization, 2019 **Short name: *WHO TRS No. 1019, Annex 3*** https://www.who.int/publications/m/item/trs1019-annex3 18. WHO General guidance on hold-time studies. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-Ninth Report Geneva, World Health Organization, 2015 **Short name: *WHO TRS No. 992, Annex 4*** https://www.who.int/publications/m/item/trs992-annex4 19. 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

	Short name: ***WHO TRS No. 961, Annex 9*** https://www.who.int/publications/m/item/trs961-annex9-modelguidanceforstoragetransport 20. 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 **Short name:** ***WHO TRS No. 992, Annex 5*** https://www.who.int/publications/m/item/trs992-annex5 21. WHO Recommendations for quality requirements when plant – derived artemisinin 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 **Short name:** ***WHO TRS No. 992, Annex 6*** https://www.who.int/publications/m/item/trs-992-annex-6 22. Guideline on data integrity. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Fifth Report Geneva, World Health Organization, 2021 **Short name:** ***WHO TRS No. 1033, Annex 4*** https://www.who.int/publications/m/item/annex-4-trs-1033 23. WHO general guidance on variations to multisource pharmaceutical products. *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifties Report* Geneva, World Health Organization, 2016 **Short name:** ***WHO TRS No. 996, Annex 10*** https://www.who.int/publications/m/item/trs966-annex10 24. 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 **Short name:** ***WHO TRS No. 1010, Annex 10*** https://www.who.int/publications/m/item/trs1010-annex10 25. Points to consider when including Health-Based Exposure Limits in cleaning validation. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Fifth Report Geneva, World Health Organization, 2021 **Short name: WHO TRS No. 1033, Annex 2** https://www.who.int/publications/m/item/annex-2-trs-1033 26. Points to consider for manufacturers and inspectors: environmental aspects of manufacturing for the prevention of antimicrobial resistance. WHO Expert Committee on Specifications for Pharmaceutical Preparations. Fifty-Fourth Report Geneva, World Health Organization, 2020 **Short name: WHO TRS No. 1025, Annex 6** https://www.who.int/publications/m/item/trs-1025-annex-6
