PERFORMANCE QUALIFICATION PROTOCOL FOR AMPOULE VERTICAL ULTRASONIC WASHING MACHINE

EQUIPMENT ID. No.	
LOCATION	**Ampoule Washing & Sterilizing Room**
DATE OF QUALIFICATION	
SUPERSEDES PROTOCOL No.	**NIL**

 PHARMA DEVILS	PERFORMANCE QUALIFICATION PROTOCOL FOR AMPOULE VERTICAL ULTRASONIC WASHING MACHINE	PROTOCOL No.:

PROTOCOL CONTENTS

 PHARMA DEVILS	**PERFORMANCE QUALIFICATION PROTOCOL FOR AMPOULE VERTICAL ULTRASONIC WASHING MACHINE**	**PROTOCOL No.:**

1.0 PROTOCOL APPROVAL:

INITIATED BY:

DESIGNATION	NAME	SIGNATURE	DATE
OFFICER/EXECUTIVE (QUALITY ASSURANCE)			

REVIEWED BY:

DESIGNATION	NAME	SIGNATURE	DATE
HEAD (PRODUCTION)			
HEAD (ENGINEERING)			

APPROVED BY:

DESIGNATION	NAME	SIGNATURE	DATE
HEAD (QUALITY ASSURANCE)			

2.0 OBJECTIVE:

- To provide documented evidence that the Equipment is performing consistently, repeatedly and reproducibly within its established operating range and the results of all test parameters meet the pre-defined acceptance criteria.

3.0 SCOPE:

- The Protocol covers all aspects of Performance Qualification for the **Ampoule Vertical Ultrasonic Washing Machine,** installed in the Ampoule Washing and Sterilizing Room.
- This Protocol will define the methods and documentation used to qualify the Ampoule Vertical Ultrasonic Washing Machine for PQ.

4.0 RESPONSIBILITY:

The Validation Group, comprising of a representative from each of the following departments, shall be responsible for the overall compliance of this Protocol.

DEPARTMENTS	RESPONSIBILITIES
Quality Assurance	• Preparation and Approval of the Performance Qualification Protocol. • Protocol Training. • Co-ordination with Quality Control, Production and Engineering to carryout Performance Qualification Activity. • Monitoring of Performance Qualification.
Production	• Review of Performance Qualification Protocol. • To co-ordinate and support Performance Qualification Activity.
Quality Control	• Analytical Support (Microbiological Testing/Analysis).
Engineering	• Review of qualification protocol for correctness, completeness and technical excellence. • Responsible for trouble shooting (if occurred during execution). • Maintenance & preventive maintenance as per schedule.

PHARMA DEVILS	PERFORMANCE QUALIFICATION PROTOCOL FOR AMPOULE VERTICAL ULTRASONIC WASHING MACHINE	PROTOCOL No.:

5.0 EQUIPMENT DETAILS:

Equipment Name	Vertical Ultrasonic Ampoule Washing Machine
Equipment	
Manufacturer's Name	Truking Technologies Ltd.
Model	
Supplier's Name	Truking Technologies Ltd.
Location of Installation	Ampoule Washing & Sterilization Room

6.0 SYSTEM DESCRIPTION:

The Automatic Washing Machine finishes the procedures from bottle infeed, ultrasonic coarse cleaning, external precision cleaning, internal precision cleaning, bottle out feed . It adopts the ultrasonic cleaning, uses the recycled water and compressed air to clean the internal and external of bottles by a series of needles and nozzles.

The washing machine consists of the following parts, such as infeed conveyor belt, ultrasonic cleaning part, scroll lifting part, water & rinsing part, out feed part and water & air circulation system.

7.0 REASON FOR QUALIFICATION:

- New equipment installed in Ampoule Washing & Sterilization Room**.**
- After completion of the Operation Qualification of the Equipments, it is imperative to perform the Performance Qualification. The study will establish that the parameters are followed, critical variables are under control and the quality of the output is, as desired.

8.0 SITE OF STUDY:

Ampoule Washing & Sterilization Room.

9.0 FREQUENCY OF QUALIFICATION:

- Once in every year ±1 month.
- After any major breakdown or after major modification.
- After Change of Location.

10.0 PRE – QUALIFICATION REQUIREMENTS:

The below mentioned activities should be completed prior to commencing the performance qualification activity:

10.1 Verification of Documents:

Verification for availability, completeness and approval status of all the required relevant documents shall be done and observations shall be recorded in the performance qualification report.

- Draft SOP for Operation & Cleaning of Ampoule Vertical Ultrasonic Washing Machine.
- Draft SOP for Preventive Maintenance of Ampoule Vertical Ultrasonic Washing Machine.

10.2 Training Record of Validation Team:

- All the persons involved in the execution of Qualification Protocol must be trained in all aspects of the qualification activity including the test methodology, acceptance criteria and safety precautions to be followed during working at service floor.

11.0 TESTS AND CHECK

11.1 Evaluation of Performance:

The following test parameters to be fixed for the below mentioned Checks:

S.No.	Cycle No.	Type of Load Ampoule Size	Set Machine Speed	Set Compressed Air Pressure	Set Re-circulated Water Pressure	Set Purified Water Pressure	Set Water For Injection Pressure
1.	I	1 ml Colorless Molded Ampoule	500 Ampoules /minute				
2.	II	1 ml Colorless Molded Ampoule	400 Ampoules/minute				
3.	III	1 ml Colorless Molded Ampoule	250 Ampoules/minute				
4.	I	2 ml Colorless Molded Ampoule	500 Ampoules /minute				
5.	II	2 ml Colorless Molded Ampoule	400 Ampoules/minute				
6.	III	2 ml Colorless Molded Ampoule	250 Ampoules/minute				
7.	I	3 ml Colorless Molded Ampoule	500 Ampoules /minute				
8.	II	3 ml Colorless Molded Ampoule	400 Ampoules/minute				
9.	III	3 ml Colorless Molded Ampoule	250 Ampoules/minute				
10.	I	5 ml Colorless Molded Ampoule	420 Ampoules/minute				
11.	II	5 ml Colorless Molded Ampoule	336 Ampoules/minute				
12.	III	5 ml Colorless Molded Ampoule	210 Ampoules/minute				

11.1.1 Objective:

To evaluate and to provide documented evidences for performance of equipment for proper washing of Ampoules. The objective of the test is to determine whether the machine is able to clean the containers and eliminate the contamination (Chemical Substances) from the container itself. This test shall be carried out for different-different Ampoule size, employed for washing.

11.1.2 Checks for machine:

A. Physical Parameters

- Production Capacity Test
- Damage Rate Test
- Clarity Test

B. Chemical Parameters

- Riboflavin test
- Chloride Content Test
- Glass Particle Test
- Endotoxin Test
- Bioburden Test

11.1.3 Test & Method:

A . Physical Parameters

S.No.	Test	Procedure	Acceptance Criteria
1.	**Production Capacity**	Infeed the 5000 Ampoules and run three times continuously, each run not less than 10 minutes, Record the time through stop watch. Repeat the cycles for 3 times. **Formula :** **Capacity** = Total no of ampoules / actual running time Calculate the Average Production capacity.	500 pcs / min – 1 ml , 2 ml, 3 ml & 420 pcs/min for 5 ml (100% speed) 400 pcs / min – 1 ml , 2 ml, 3 ml & 336 pcs/min for 5 ml (80% speed) 250 pcs / min – 1 ml , 2 ml, 3 ml & 210 pcs/min for 5 ml (50% speed)
2.	**Damage Rate**	Infeed the 5000 Ampoules and run the machine at rated speed condition. Observe the damaged ampoules for 10 min. **Formula :** **Damage Rate (%) = Total damaged ampoules x 100/ Total feeding ampoules**	Damage should not be more than 0.5 %
3.	**Clarity**	Collect the 10 Ampoules quantity from infeed position in preheating zone and then transfer the washed ampoules in to glass flask add the filtered WFI and shake for 5 minutes, Collect the water from the flask in cleaned glass test tube and check visually the foreign matter in black and white background.	Clarity should be more than 98%

B. Chemical Parameters

RIBOFLAVIN TEST:

- A 0.02% riboflavin solution is prepared by adding 0.2g of Riboflavin per 1000 ml of WFI.
- Take 60 Ampoules from each selected parameter and spike the Ampoules with approximate riboflavin slurry made with 1 ml of WFI. The Ampoules were swirled manually so that slurry uniformly coats the inner surface of Ampoules. The solution was evaporated to dryness by heating the Ampoules at 105°C in hot air oven for 1 hour; mark the Ampoules by putting Teflon thread in the neck side.
- Load these marked Ampoules along with similar sized Ampoules in the feed SS guide channel and Operate the Ultrasonic Ampoule Washing Machine as per SOP.
- Tested Ampoules shall have identification code & marked on it and send to QC.
- Collect marked 20 Ampoules from all 20 channels for riboflavin detection test and all wetted surfaces are inspected for remaining riboflavin using a UV lamp at either 365 or 254nm wavelength for riboflavin detection.
- At the same time perform blank for the riboflavin detection test also.
- Record the observation in Performance Qualification Report.

Acceptance criteria:

The Ampoules should be free from surface coating of Riboflavin.

CHLORIDE CONTENT TEST:

- Prepare 5 liters of 10 % w/v a Standard Sodium Chloride Solution.
- Take 20 Ampoules for each and spike the sodium chloride solution 0.1 ml qty. for 1 & 2 ml & 3 ml Ampoule and 1 ml. qty. for 5 ml Ampoules. Take out the Ampoules and dry the Ampoules in hot air oven at 105°C for at least 1 hours.
- Load these marked Ampoules along with similar sized Ampoules in the feed SS guide channel and send to QC for further test.
- **Procedure Test for QC**: For the chloride identification test add 0.2 ml of 1.0M Silver Nitrate reagent plus 1ml dilute nitric acid in every Ampoule and for Blank repeat the same procedure with good Ampoules. Test passes if no opalescence or no turbidity is seen in all the Ampoules including the blank also.
- Record the observation in Performance Qualification Report.

Acceptance criteria:

All individual Tested Ampoules should be showing no turbidity or no opalescence after adding the above mentioned reagents.

GLASS PARTICLE TEST

- Take 20 Ampoules for each and spike the Ampoules with fine glass fragments; mark the Ampoules by putting Teflon thread in the neck side.
- Load these marked Ampoules along with similar sized Ampoules in the feed SS guide channel Collect one Ampoule from each nozzle for Visual inspection after Washing from the out feed conveyor. For Visual Inspection, add 0.7 ml WFI in to 1ml Ampoules, 1.4 ml WFI in to 2 ml Ampoules, 2.1ml WFI in to 3 ml Ampoules and 3.75 ml WFI in to 5 ml Ampoules.
- Visually inspect the Ampoules for the presence of any glass fragments against white and black background.
- Record the observation in Performance Qualification Report.

Acceptance criteria:

The Ampoules should be free from the glass particles (Visual inspection).

ENDOTOXIN TEST

- Take 10 ampoules from each cycle and send to micro for further analysis as per SOP.
- Perform the test for each size of ampoule.

Acceptance criteria:

NMT 0.25 EU/ml

BIOBURDEN TEST

- Take 10 ampoules from each cycle and send to micro for further analysis.
- Perform the test for each size of Ampoule. Fill approx. half of the total volume of ampoule with sterile saline and shake it properly.
- Filter the whole content of each Ampoule through sterile filtration assembly (0.45µ membrane filter) and rinse with 100 ml of sterilized 0.1% peptone water.

- Lift the membrane filter with sterilized forceps and place on pre-incubated Soyabean casein digest agar plate by avoiding air bubble.
- Incubate plates at 20-25 °C for 72 hrs followed by 30-35 °C for 48 hrs.

Acceptance criteria:

Ampoules after washing: NMT 10 cfu/100 ml

11.1.4 Sampling Plan:

Batch No.	1st Cycle		2nd Cycle		3rd Cycle		Total sampled Ampoules	Justification for sampling
	Sampling Stage	No. of Sampled Ampoules	Sampling Stage	No. of Sampled Ampoules	Sampling Stage	No. of Sampled Ampoules		
Riboflavin test	After Washing	20	After Washing	20	After Washing	20	60	To ensure proper washing of Ampoules
Chloride test	After Washing	20	After Washing	20	After Washing	20	60	To ensure proper washing of Ampoules
Glass particle test	After Washing	20	After Washing	20	After Washing	20	60	To ensure proper washing of Ampoules
Endotoxin test	After Washing	10	After Washing	10	After Washing	10	30	To ensure proper washing of Ampoules
Bioburden Test	After Washing	10	After Washing	10	After Washing	10	30	To ensure proper washing of Ampoules

12.0 CHECKLIST OF ALL TESTS & CHECKS:

A checklist shall be provided to ensure that all tests or checks required for this protocol have been executed. After execution observations shall be recorded in Performance Qualification Report.

The list includes:

- Verification of Speed Performance.
- Verification of performance using test for chloride.
- Verification of performance using test for riboflavin.
- Verification of Glass Particle Test.
- Verification of Bioburden Test
- Verification of Endotoxin Test.

13.0 REFERENCES:

- EU GMP Annexure- 15.

14.0 DOCUMENTS TO BE ATTACHED:

- Raw data generated during testing.
- Any Other Relevant Documents

15.0 NON COMPLIANCE:

All the Non-compliances of procedure, specifications and sampling, analysis and documentation activities shall be monitored & recorded.

16.0 DEVIATION FROM PRE-DEFINED SPECIFICATION, IF ANY:

- In case of any deviation observed during PQ, inform to Head QA for necessary action.
- Document the deviation detail in observed deviation section.
- The Head QA will study the impact of deviation. If deviation is acceptable and it does not have an Impact on operation as well as on performance of the machine & prepare final conclusion.

17.0 CHANGE CONTROL, IF ANY:

- If any change control is required during PQ, inform to Head QA for necessary action.
- Document the details observed.
- The Head QA will study the impact of change. If change is acceptable and it does not have an Impact on operation as well as on performance of the machine & prepare final conclusion.

18.0 ABBREVIATIONS:

CFR	:	Code of Federal Regulations
cGMP	:	Current Good Manufacturing Practices
DQ	:	Design Qualification
EU	:	European Union
FDA	:	Food and Drug Administration
ID.	:	Identification
IQ	:	Installation Qualification
MOC	:	Material of Construction
NLT	:	Not Less Than
OQ	:	Operational Qualification
PQ	:	Performance Qualification
QA	:	Quality Assurance
QC	:	Quality Control
SS	:	Stainless Steel
WFI	:	Water for injection
WHO	:	World Health Organization