



PHARMA DEVILS

**INSTALLATION QUALIFICATION PROTOCOL  
FOR  
AUTOMATIC CAPSULE FILLING MACHINE**

**PROTOCOL No.:**

**INSTALLATION QUALIFICATION  
PROTOCOL CUM REPORT  
FOR  
AUTOMATIC CAPSULE FILLING  
MACHINE**

|                                |                        |
|--------------------------------|------------------------|
| <b>EQUIPMENT ID. No.</b>       |                        |
| <b>LOCATION</b>                | <b>Capsule Filling</b> |
| <b>DATE OF QUALIFICATION</b>   |                        |
| <b>SUPERSEDES PROTOCOL No.</b> | <b>NIL</b>             |



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**1.0 PRE – APPROVAL:**

**PREPARED BY:**

| DESIGNATION                              | NAME | SIGNATURE | DATE |
|--|------|-----------|------|
| OFFICER/EXECUTIVE<br>(QUALITY ASSURANCE) |      |           |      |

**REVIEWED BY:**

| DESIGNATION                             | NAME | SIGNATURE | DATE |
|---|------|-----------|------|
| OPERATING MANGER<br>(QUALITY ASSURANCE) |      |           |      |
| HEAD<br>(PRODUCTION)                    |      |           |      |
| HEAD<br>(ENGINEERING)                   |      |           |      |

**APPROVED BY:**

| DESIGNATION                 | NAME | SIGNATURE | DATE |
|-----------------------------|------|-----------|------|
| HEAD<br>(QUALITY ASSURANCE) |      |           |      |



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**2.0 OBJECTIVE:**

- To provide documented evidence for the Installation Qualification of Automatic Capsule Filling Machine.
- To confirm that the equipment and its components are installed as per the Specifications mentioned in the design qualification document and other requirements given by supplier.

**3.0 SCOPE:**

- The scope of this installation qualification protocol cum report is limited to qualification Automatic Capsule Filling Machine (Make – anchor mark) to be installed in the Capsule filling.
- This document provides all the relevant information related to specification, installation checks and acceptance criteria to be required to perform installation qualification activity of Automatic Capsule Filling Machine.

**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 cum Report:

| <b>DEPARTMENTS</b>       | <b>RESPONSIBILITIES</b>  |
|--------------------------|--|
| <b>Quality Assurance</b> | <ul style="list-style-type: none"><li>• Initiation, Authorization, Approval and Compilation of the Installation Qualification Protocol cum Report.</li><li>• Co-ordination with Production and Engineering to carryout Qualification activity.</li><li>• Monitoring of Installation Qualification Activity.</li></ul>  |
| <b>Production</b>        | <ul style="list-style-type: none"><li>• Review Pre &amp; post Approval of Protocol cum Report.</li><li>• To Co-ordinate and support for Execution of Qualification study as per Protocol.</li></ul>  |
| <b>Engineering</b>       | <ul style="list-style-type: none"><li>• Review Pre &amp; post Approval of Protocol cum Report.</li><li>• Co-ordination, Execution and technical support in Automatic Capsule Filling Machine Installation Qualification Activity.</li><li>• Calibration of Process Instruments.</li><li>• Responsible for Trouble Shooting (if occurs during execution).</li></ul> |



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**5.0 EQUIPMENT DETAILS:**

|                                 |                                    |
|---------------------------------|------------------------------------|
| <b>Equipment Name</b>           | Automatic Capsule Filling Machine. |
| <b>Equipment</b>                |                                    |
| <b>Manufacturer's Name</b>      | Anchor mark private limited        |
| <b>Model</b>                    | PHARMAFILL A120                    |
| <b>Supplier's Name</b>          |                                    |
| <b>Location of Installation</b> | Capsule filling                    |

**6.0 SYSTEM DESCRIPTION:**

The entire equipment can be classified into two zones production zone and non-production zone:

**6.1 Production Zone**

- The production zone encompasses the upper portion of the Capsule Filling Machine and is enclosed by the acrylic doors followed by interlock system.
- The production zone includes the loader assembly, powder assembly with rejection system, un-separated capsule rejection assembly, locking assembly, ejection assembly and turret assembly.
- The loader assembly consists of the loader body with magazine & finger block assembly, raceway and pusher block. The capsules descend from magazine onto the slots of the raceway and the pusher block then orients the capsules on the raceway. The finger block then releases the capsule with cap up and body down position.
- The powder assembly consists of the tamping punches, punch guide plate, scrapper plate, dosing disc with drum. The dosing disc is indexed with six station indexers. The tamping pins are used to tamp the powders at the 5 stations and at the 6th station the slug is ejected out into the body of the capsule placed in the bottom segment.
- The rejection assembly consists of the rejection bracket that reciprocates on every stroke of the machine. The rejection bracket aids in raising the un-separated capsule. The capsules are then sucked by means of the vacuum blower.
- Locking assembly consists of locking pins that reciprocate on every stroke of machine. The pins are used to lock the filled capsules against fixed plate on the opposite side.
- The ejection assembly consists of the ejection pins that reciprocates on every stroke of the machine and ejects the filled capsule into the outlet chute with blow of pneumatic air.
- The turret assembly consists of turret, top cam, bottom cam, top segment and bottom segment. The turret is driven by the twelve-station indexer.

The following operations are performed at each station



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- Station for loading and separation of the capsules (ROW 1)
- Station for loading and separation of the capsules (ROW 2)
- Upward movement of the top segment and backward movement of the bottom segment
- Station for filling Pellet / Tablet into the capsule
- Station for filling powder into the capsule
- Station for filling Pellet / Tablet into the capsule
- Station for rejecting the un-separated capsules
- Downward movement of the top segment and forward movement of the bottom segment
- Station for locking the capsule
- Station for idle station
- Station for ejecting the capsule
- Station for cleaning the segments

## **6.2 Non-Production Zone**

- The non-production zone encompasses the lower portion of the machine and is enclosed within the SS panel sheets. It also includes the area above the production zone of the machine
- The non-production zone includes the entire drive assembly. The drive assembly consists of the brake motor & gearbox assembly connected to the main shaft via chain & sprocket assembly.
- The cams for the respective stations are mounted on the main shaft and the drive to the station is through cam follower, lever and tie rod attached to the assembly in the production zone.
- The 12-station indexer for turret and 6 station indexers for powder filling assembly is located in the non-production zone at the bottom side of the top plate. The drive to the indexer from the main shaft is through separate chain & sprocket arrangement.
- The electrical control panel is placed separately in the Capsule filling room beside the main machine. It includes the MCB, contactors, O/L relay, PLC, relay card, VFD, SMPS terminals etc
- The drive to the powder hopper assembly to stirrer is from the separate motor & gearbox assembly. The motor & gearbox assembly is placed in the area below the production zone.

## **6.3 Pellet / Granule filling attachment (2 Nos.)**

The Pellet feeding assembly consists of the Pellet hopper, dosage adjustment block, dosage adjustment finger plate and lower fixed block. The Pellets are transferred from Pellet hopper into the dosage adjustment block through Pellet hopper discharge pipe. The sliding plate is reciprocated by means of the cam lever mechanism which delivers the Pellets into the capsule body. Amount of dosage can be varied with the dosage adjustment finger plate.



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Machine will be supplied with 1 No. of pellet filling attachment each for capsule size #0 & capsule size #3

**6.4 Tablet filling attachment (2 Nos.)**

The tablet feeding assembly consists of the vibratory bowl, magazine, sliding plate and lower fixed block. The tablets are oriented and transferred into the magazine from the vibratory bowl. The tablets are then transferred into the lower fixed block through the reciprocating action of the sliding plate. The sliding plate is reciprocated by means of the pneumatic cylinder arrangement. Tablet filling attachments for capsule size #0 will be fits either side of the powder filling station.

Machine is provided with the special feature of rejecting the single capsule for No Tablet filling & if the 5 capsules are observed continuously without tablet machine will stop. These will give exact the quantity of capsule rejected due to NO Tablet Filling.

**6.5 Control System**

The Control system for the equipment is a standard control based system. Control panel with all related electrical and pneumatic components is provided separately from main machine. The Operating panel cum control panel provided is of SS 304 in construction.

**7.0 PRE – QUALIFICATION REQUIREMENTS:**

**7.1 Verification of Documents:**

- Executed and approved design qualification document.
- Piping and instrumentation diagram (P& ID).
- Technical specification of equipment.
- Calibration certificate of components.
- Certificate of material of construction of components.

**7.1.1 Procedure:**

- Verify the above mentioned documents for availability, completeness and approval status
- If any deviation is observed the same has to be recorded giving reasons for deviation and approved. Deviation should be approved by Authorized person.
- Approved Drawings and supporting documents would form a part of the IQ Protocol cum report.

**7.1.2 Acceptance Criteria:**

- All the documents should be available, complete and approved by respective authorities.



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**8.0 CRITICAL VARIABLES TO BE MET:**

**8.1 GENERAL CHECKS AND LOCATION SUITABILITY:**

| <b>Installation Checks</b>                | <b>Acceptance Criteria</b>   | <b>Observation</b> |
|---|--|--------------------|
| <b>Grouting And Mounting</b>              | Should be grouted & mounted properly.  |                    |
| <b>Leveling</b>                           | The equipment should be balanced and leveled properly.                             |                    |
| <b>Edges of parts</b>                     | All the edges of metal parts should be grinded and no sharp edges should be there. |                    |
| <b>Welding of Joints</b>                  | The welding joints should not have any burrs.                                      |                    |
| <b>Place of Installation</b>              | Capsule filling  |                    |
| <b>Illumination in area</b>               | NLT 300 Lux.   |                    |
| <b>Working space around the equipment</b> | Should be sufficient for easy operation, cleaning, sanitation and maintenance.     |                    |

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**8.2 PRELIMINARY CHECK LIST – OVERALL CONDITION:**

| <b>S.No.</b> | <b>Checks to be performed:</b>  | <b>Observation</b> |
|--------------|---|--------------------|
| 1.           | Check for the overall dimensions  |                    |
| 2.           | Check for the receipt of the consignment with reference to the packing list |                    |
| 3.           | Check for the horizontal leveling and proper positioning of the equipment   |                    |
| 4.           | Check for scratches on the machine body                                     |                    |
| 5.           | Check for the condition of the acrylic door.                                |                    |
| 6.           | Check for the dents on the pillars and the side covers of the machine body. |                    |
| 7.           | Check for the condition of the filter bag in the vacuum filter tank         |                    |
| 8.           | Check for the condition of the filter bag in de-dusting filter tank         |                    |

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**8.3 COMPONENT LOCATION LIST:**

| S.No.             | Component   | Location                           | Observation |
|-------------------|---|------------------------------------|-------------|
| <b>Mechanical</b> |   |                                    |             |
| 1.                | Main motor  | Inside machine stand               |             |
| 2.                | Main motor gearbox  | Inside machine stand               |             |
| 3.                | Cams & levers for loader, rejection, ejection assemblies etc  | Inside the machine stand           |             |
| 4.                | Indexer for turret drive  | Inside the machine stand           |             |
| 5.                | Turret assembly consisting of top cam & bottom cam with top & bottom segment                        | Assembled on the machine top plate |             |
| 6.                | Loader assembly consisting of magazine, capsule release blade, raceway, pusher block and finger bag | Assembled on the machine top plate |             |
| 7.                | Rejection bracket assembly  | Assembled on the machine top plate |             |
| 8.                | Ejection pin assembly   | Assembled on the machine top plate |             |
| 9.                | Capsule hopper  | Assembled on the machine top plate |             |
| 10.               | Vacuum pump motor   | Assembled to the vacuum pump       |             |
| 11.               | Blower motor  | Assembled to the Blower            |             |
| 12.               | Powder filling assembly   | Assembled on the machine top plate |             |
| 13.               | Tablet Station 1 assembly   | Before Powder Filling station      |             |
| 14.               | Tablet station 2 assembly   | After powder filling station       |             |
| 15.               | Pellet filling assembly   | After powder filling station       |             |
| <b>Electrical</b> |   |                                    |             |
| 1.                | MCB for Main Motor  | Inside Electrical Control Panel.   |             |
| 2.                | MCB for control circuit   | Inside Electrical Control Panel.   |             |
| 3.                | MCB for Vacuum pumps & Blower   | Inside Electrical Control Panel.   |             |
| 4.                | Contactor for vacuum pump motor   | Inside Electrical Control Panel.   |             |
| 5.                | Contactor for blower motor  | Inside Electrical Control Panel.   |             |
| 6.                | Contactor for powder auger motor  | Inside Electrical Control Panel.   |             |
| 7.                | Overload relay for vacuum pump  | Inside Electrical Control Panel.   |             |
| 8.                | Overload relay for blower motor   | Inside Electrical Control Panel.   |             |
| 9.                | Overload relay for powder auger motor   | Inside Electrical Control Panel.   |             |
| 10.               | PLC   | Inside Electrical Control Panel.   |             |
| 11.               | Add on Digital Input & Digital Output cards   | Inside Electrical Control Panel.   |             |



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| S.No.            | Component   | Location   | Observation |
|------------------|---|--|-------------|
| 12.              | SMPS  | Inside Electrical Control Panel.                   |             |
| 13.              | Phase failure                                       | Inside Electrical Control Panel.                   |             |
| 14.              | Brake contactor                                     | Inside Electrical Control Panel.                   |             |
| 15.              | Relay Cards   | Inside Electrical Control Panel.                   |             |
| 16.              | VFD for main motor                                  | Inside Electrical Control Panel.                   |             |
| 17.              | Emergency Push Button                               | Operating Panel                                    |             |
| 18.              | HMI   | Operating panel                                    |             |
| 19.              | Inductive sensor                                    | Inside the machine stand & above the machine stand |             |
| 20.              | Capsule level sensors                               | Fit With the capsule hopper                        |             |
| 21.              | Powder Sensor                                       | On the Powder hopper                               |             |
| 22.              | Tablet sensors                                      | Fit with tablet magazine at station 1 & 2          |             |
| 23.              | Pellet sensor                                       | Fits on the pellet hopper                          |             |
| 24.              | Vibrator controller                                 | Fit with panel inside the drive unit               |             |
| <b>Pneumatic</b> |   |  |             |
| 1.               | Digital pressure switch for Main air pressure       | Pneumatic panel plate inside the drive unit        |             |
| 2.               | Digital pressure switch for vacuum pressure         | Operating Panel                                    |             |
| 3.               | Actuating Cylinder for capsule loader               | On the capsule loader                              |             |
| 4.               | Actuating Cylinder for Tablet station               | Fit with tablet assembly station 1 & station 2     |             |
| 5.               | Actuating Cylinder for sampling with ejection chute | On the ejection chute.                             |             |
| 6.               | FR Unit   | On the machine back panel                          |             |
| 7.               | Solenoid Valves                                     | On the pneumatic plate                             |             |
| 8.               | Solenoid Coils                                      | On the solenoid valves                             |             |
| 9.               | Silencers   | On the manifold                                    |             |
| 10.              | Manifold  | On the pneumatic plate                             |             |



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**8.4 DETAILED COMPONENT CHECK LIST – PHYSICAL SPECIFICATION:**

| S.No.             | Component Description                      | Specification  | Observation |
|-------------------|--|--|-------------|
| <b>Mechanical</b> |  |  |             |
| 1.                | Main motor                                 | Make- Bonfiglioli, 1430RPM,<br>2 HP, 415 V, 50 Hz            |             |
| 2.                | Main gearbox                               | Make- Bonfiglioli,<br>Model - AS25 P P90                     |             |
| 3.                | Powder feeder motor                        | Make- Bonfiglioli, BN71B4, 0.5 HP,<br>415 V, 50 Hz, 1397 RPM |             |
| 4.                | Powder feeder gearbox                      | Make- Bonfiglioli, Ratio-28:1<br>Model - VF49FA228P71B5B3    |             |
| 5.                | De-dusting blower                          | Make- Minivac,<br>Model - SVR-200                            |             |
| 6.                | De-dusting blower motor                    | Make- Hindustan Motor, 5 HP, 2900<br>RPM, 415 V, 50 Hz       |             |
| 7.                | Vacuum Pump-1                              | Make- Minivac,<br>Model - SVL 1000,                          |             |
| 8.                | Vacuum pump 1 motor                        | Make- Hindustan,<br>3 HP, 415 V, 50 Hz,<br>1440 RPM          |             |
| 9.                | Vacuum Pump-2                              | Make- Minivac,<br>Model - SVL 1000,                          |             |
| 10.               | Vacuum pump 2 motor                        | Make- Hindustan, 3 HP, 415 V,<br>50 Hz, 1440 RPM             |             |
| 11.               | Vacuum tank filter bag                     | Material – 100% cotton                                       |             |
| 12.               | De-dusting tank filter bag                 | Material – PC Satin  |             |
| <b>Electrical</b> |  |  |             |
| 1.                | MCB for Main Motor                         | Make – Schneider,<br>10A, 3 poles                            |             |
| 2.                | MCB for control circuit, PLC, SMPS         | Make – Schneider,<br>6 A, 2 poles                            |             |
| 3.                | MCB for Vacuum Blower &<br>Accessories     | Make – Schneider,<br>32 A, 3 poles                           |             |
| 4.                | VFD for Main motor                         | Make – Mitsubishi,<br>Model – FR-D740-036-E16                |             |
| 5.                | Contactor for vacuum pump (2 Nos)          | Make – Siemens, 3TF30, 10E                                   |             |
| 6.                | Contactor for de-dusting blower            | Make – Siemens, 3TF30, 10E                                   |             |
| 7.                | Contactor for powder feeder motor          | Make – Siemens, 3TF30, 10E                                   |             |
| 8.                | Overload relay for vacuum pump<br>(2 nos.) | Make – Siemens,<br>3.2 - 5 A                                 |             |



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| S.No.            | Component Description                         | Specification  | Observation |
|------------------|---|--|-------------|
| 9.               | Overload relay for de-dusting blower          | Make – Siemens, 5 - 8 A  |             |
| 10.              | Overload relay for powder feeder motor        | Make – Siemens, 0.63-1 A   |             |
| 11.              | Brake Contactor                               | Make- GIC  |             |
| 12.              | Relay Cards (02nos.)                          | Make – Shavison Electronics, 8 Way                                     |             |
| 13.              | SMPS  | Make – Omron,<br>Model: S8VKC06024                                     |             |
| 14.              | PLC   | Make – Mitsubishi,<br>Model – FX 3GE-40M                               |             |
| 15.              | Add on cards                                  | Make – Mitsubishi,<br>Model – FX2N-16EX (3 Nos.)<br>FX2N-16EYT (2 Nos) |             |
| 16.              | HMI   | Make – Beijer,<br>Model – X2 base                                      |             |
| 17.              | Emergency P/B                                 | Make – Teknic  |             |
| 18.              | Control ON/OFF Switch                         | Make – Teknic  |             |
| 19.              | Buzzer  | Make - Sumo  |             |
| 20.              | Inductive sensor                              | Make – Omron   |             |
| 21.              | Capacitive sensor                             | Make – IFM Sensor  |             |
| 22.              | Capsule level sensor                          | Make – Sick,   |             |
| 23.              | Tablet Sensor                                 | Make - Panasonic   |             |
| 24.              | Pellet level sensor                           | Make – Sick,<br>CM18-12NPP-EC1 (1 No.)                                 |             |
| 25.              | Door sensor                                   | Make – Sick,<br>RE11-SAC & RE11 (08 Nos.)                              |             |
| 26.              | Main Switch                                   | Make – L & T Salzer, 24V DC  |             |
| <b>Pneumatic</b> |   |  |             |
| 1.               | Digital Pressure switch for Main air pressure | Make – Panasonic   |             |
| 2.               | Digital pressure switches for vacuum. (2 Nos) | Make – SMC,<br>Model: ZSE 30   |             |
| 3.               | Actuating Cylinder (Ejection chute)           | Make – SMC,<br>Model: CJ2B-16-25Z,<br>16 mm bore x 25 mm stroke        |             |
| 4.               | Actuating Cylinder (Loader)-2 nos.            | Make – CKD<br>Model: SSD-D-12-5  |             |
| 5.               | Actuating Cylinder (Tablet Assembly) - 2 nos. | Make – Festo,<br>Model: AND-20-10-A-P-A                                |             |



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| S.No. | Component Description   | Specification  | Observation |
|-------|---|--|-------------|
| 6.    | Tablet unfilled capsule rejection solenoid valve with flow controller | Make – Festo,<br>Model – VUVG-L14-T32C-MT-G18-1P3    |             |
| 7.    | Tablet cylinder actuating solenoid valve                              | Make – Festo,<br>Model – VUVG-L14-T32C-MT-G18-1P3    |             |
| 8.    | FR Unit   | Make – Festo, Model: LFR– D – Mini, Filter Regulator |             |
| 9.    | Solenoid Valves-5 nos   | Make – SMC Pneumatics<br>SY5120-4-LZ-01              |             |
| 10.   | Manifold  | Make – SMC Pneumatics                                |             |
| 11.   | Silencers   | Make – SMC Pneumatics                                |             |
| 12.   | Tubings   | Make – SMC Pneumatics, PU6 & PU8                     |             |

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**8.5 MATERIAL OF CONSTRUCTION:**

| S. No. | Components            | Material of Construction (MOC) | Observation |
|--------|-----------------------|--------------------------------|-------------|
| 1.     | Powder Hopper         | MOC Certificate                |             |
| 2.     | Stirrer               | MOC Certificate                |             |
| 3.     | Powder outlet pipe    | MOC Certificate                |             |
| 4.     | Powder drum           | MOC Certificate                |             |
| 5.     | Scraper block         | MOC Certificate                |             |
| 6.     | Scraper holding plate | MOC Certificate                |             |
| 7.     | Dosing disc           | MOC Certificate                |             |
| 8.     | Tamping punch         | MOC Certificate                |             |
| 9.     | Top segment           | MOC Certificate                |             |
| 10.    | Bottom segment        | MOC Certificate                |             |
| 11.    | Pellet Hopper         | MOC Certificate                |             |
| 12.    | Pellet Discharge Pipe | MOC Certificate                |             |

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**8.6 VERIFICATION OF TEST CERTIFICATES:**

| S.No. | Component                | Type of Certificate | Observation |
|-------|--------------------------|---------------------|-------------|
| 1.    | Main motor               | Test Certificate    |             |
| 2.    | Main motor gearbox       | Test Certificate    |             |
| 3.    | Powder motor             | Test Certificate    |             |
| 4.    | Powder motor gearbox     | Test Certificate    |             |
| 5.    | Vacuum pump              | Test Certificate    |             |
| 6.    | Vacuum pump motor        | Test Certificate    |             |
| 7.    | Blower                   | Test Certificate    |             |
| 8.    | Blower motor             | Test Certificate    |             |
| 9.    | Powder sensor            | Test Certificate    |             |
| 10.   | Capsule sensors          | Test Certificate    |             |
| 11.   | pellet sensor            | Test Certificate    |             |
| 12.   | Tablet Sensors           | Test Certificate    |             |
| 13.   | Main Air Pressure switch | Test Certificate    |             |

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**8.7 POWER AND UTILITY CHECKLIST:**

| Sr. No. | Utility Parameter                  | Method of verification  | Acceptance Criteria                 | Observation |
|---------|------------------------------------|-------------------------|-------------------------------------|-------------|
| 1.      | Phase                              | Visual Check            | 3 Phase                             |             |
| 2.      | Voltage Test<br>(Using Multimeter) | R ∇ Y<br>Y ∇ B<br>R ∇ B | 415 ± 10%<br>415 ± 10%<br>415 ± 10% |             |
| 3.      | Frequency                          | Multimeter              | 50 Hz                               |             |

**Inference:**

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**Reviewed By  
Sign & Date:**



PHARMA DEVILS

**INSTALLATION QUALIFICATION PROTOCOL  
FOR  
AUTOMATIC CAPSULE FILLING MACHINE**

**PROTOCOL No.:**

**9.0 REFERENCES:**

**The Principle Reference is the following:**

- Validation Master Plan
- Schedule-M – “Good Manufacturing Practices and Requirements of Premises, Plant and Equipment for Pharmaceutical Products.”
- WHO Essential Drugs and Medicines Policy, QA of Pharmaceuticals, Vol-2 – Good Manufacturing Practices and Inspection.

**10.0 DOCUMENTS TO BE ATTACHED:**

- Technical details for Equipment Requirement with Engineering Drawings.
- Certificate of MOC
- Calibration certificates

**11.0 DEVIATION FROM PRE-DEFINED SPECIFICATION, IF ANY:**

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**12.0 CHANGE CONTROL, IF ANY:**

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**13.0 REVIEW (INCLUSIVE OF FOLLOW UP ACTION, IF ANY):**

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**INSTALLATION QUALIFICATION PROTOCOL  
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AUTOMATIC CAPSULE FILLING MACHINE**

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**14.0 CONCLUSION:**

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**15.0 RECOMMENDATION:**

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**INSTALLATION QUALIFICATION PROTOCOL  
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**16.0 ABBREVIATIONS:**

|        |   |                                    |
|--------|---|------------------------------------|
| PVT.   | : | Private limited                    |
| LTD.   | : | Limited                            |
| IQ.    | : | Installation Qualification         |
| BOF.   | : | Brought out of items               |
| URS.   | : | User Requirement Specification     |
| MCB    | : | Miniature Circuit Breaker          |
| VFD    | : | Variable Frequency Drive           |
| SMPS   | : | Switched mode power Supply         |
| MOC    | : | Material of Construction           |
| NOS    | : | Numbers                            |
| NLT    | : | Not less than                      |
| NMT    | : | Not more than                      |
| °C     | : | Temperature                        |
| RH     | : | Relative Humidity                  |
| LPM    | : | Liter per minutes                  |
| Kg.    | : | Kilo gram                          |
| GMP    | : | Good Manufacturing Practice        |
| P.O.   | : | Purchase Order                     |
| Hz     | : | Hertz                              |
| H.P.   | : | Horse Power                        |
| A.C.   | : | Alternating Current                |
| V      | : | Voltage                            |
| RPM    | : | Rotation per Minute                |
| mm     | : | Millimeter                         |
| S.S.   | : | Stainless Steel                    |
| MOC    | : | Material of Construction           |
| GA     | : | General Arrangement                |
| P & ID | : | Piping and Instrumentation Diagram |
| M. S.  | : | Mild Steel                         |
| PLC    | : | Programmable logical controller    |



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**INSTALLATION QUALIFICATION PROTOCOL  
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**PROTOCOL No.:**

**17.0 POST APPROVAL:**

**INITIATED BY:**

| DESIGNATION                              | NAME | SIGNATURE | DATE |
|--|------|-----------|------|
| OFFICER/EXECUTIVE<br>(QUALITY ASSURANCE) |      |           |      |

**REVIEWED BY:**

| DESIGNATION                              | NAME | SIGNATURE | DATE |
|--|------|-----------|------|
| OPERATING MANAGER<br>(QUALITY ASSURANCE) |      |           |      |
| HEAD<br>(PRODUCTION)                     |      |           |      |
| HEAD<br>(ENGINEERING)                    |      |           |      |

**APPROVED BY:**

| DESIGNATION                 | NAME | SIGNATURE | DATE |
|-----------------------------|------|-----------|------|
| HEAD<br>(QUALITY ASSURANCE) |      |           |      |