



PHARMA DEVILS

**DESIGN QUALIFICATION PROTOCOL
FOR
SCREW CAPPING MACHINE**

PROTOCOL No.:

DESIGN QUALIFICATION

NAME OF THE ITEM: SCREW CAPPING MACHINE

FUNCTIONAL AREA: PRODUCTION BLOCK

PROTOCOL No. :



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1.0 PROTOCOL APPROVAL:

Protocol Prepared By:

Functional area	Name	Signature	Date
Engineering			

DQ Reviewed By:

Functional area	Name	Signature	Date
Engineering			
Production			
Quality Assurance			

DQ Approved By:

Functional area	Name	Signature	Date
Head Engineering			
Head Manufacturing			
Head Quality			



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2.0 Objective:

The purpose of this document is to ensure that all the critical aspects of the Equipment, cGMP & Safety features have been considered in designing the equipment/instrument and is properly Documented.

2.0 Responsibilities:

In accordance with the document, following functions shall be responsible for initiation and finalization of Equipment user requirement specification. When the work is carried by contract/ consulting staff.

3.1 Preparation of Document

- User department to prepare the DQ
- Ensures that the document is in compliance with current policies and procedures of cGMP regulations.
- Ensures that the content is sufficient, clearly defined, technically sound and accurate.
- It is a Guidance document to prepare the DQ.

3.2 Review of Document

- To be reviewed by Head of the user department and functional department (Engineering & Quality assurance)

3.3 Approval of Document

- Approval of document by Head Manufacturing/Head Engineering/Head Quality.

4.0 Equipment Description & Identification:

4.1 Scope: Screw cap sealing machine.

4.2 Purpose: Purpose of equipment is to carry out the sealing of bottle by screw cap.

4.3 System Description:

Very High Speed screw capping machine is versatile self-supported on stainless steel leg with height adjustable adjustment system. The machine is precision Equipment on sturdy welded steel frame completely enclose in stainless steel sheet and doors are provided to facilitate to servicing of m/c. The container moving on conveyor belt are separated by in feed worm and transferred to the infeed turret which then transfer it to the center turret below the cap sealing head. The caps are oriented in the cap orienter, the oriented caps are moved to the cap transfer turret thru' the cap chute. The cap sealing head, which is synchronized with the cap transfer turret, picks up the cap from the cap transfer turret. The cap sealing head comes down on the container and tightens the cap with preset torque. Each cap sealing head is provided with an adjustable torque magnetic clutch. The clutch slips on reaching the adjusted torque. The capped container is then moved from center turret to the out feed turret and then on to the exit side of the conveyor.



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5.0 USER REQUIREMENTS

5.1 System Requirements:

S.No.	SYSTEM COMPONENTS	SYSTEM REQUIREMENTS
1	Identification (In case of Equipment /Instrument)	Screw cap sealing machine
2	Model/Type	JPSC-9
3	Capacity	Max. 240 bottles per minute.
4	Potential Suppliers	JP machine Tools
5	Contact parts (In case of Equipment)	SS316 with mirror finish
6	Non contact parts (In case of Equipment)	SS304 with matt finish
7	Non metallic contact parts (In case of Equipment /Instrument)	1. Any material with food grade quality having no potential impact on the products. 2. Durable. 3. Must be easily cleanable.
8	Motor & Electrical installations (In case of Equipment /Instrument)	Machine should be operated through PLC mounted on electrical control panel.
9	Machine assemblies (In case of Equipment /Instrument)	Must be covered with SS 304
10	Machine adjustments (In case of Equipment /Instrument)	Setting with Zero clearance with good accuracy.
11	Packaging & Transport	Should be packed and transported in such a way to avoid any damage during transportation.
12	No. of requirements	01
13	Requirements for any power failure backup's (In case of Equipment /Instrument)	To be backed up by installed in-house DG set.
14	Gear box specifications(In case of Equipment/Instrument)	As per cGMP model
15	Machine specification	
16	Operation	Automatic with Manual operation facility during PLC failure
17	Door Position	Vertical Transparent Acrylic. Magnetic door switches to sense door open
18	Control System	Enclosure: SS304

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5.2 Technical Description

S.No.	Heading	Specification
1	Application	Screw cap sealing of bottles with cGMP norms.
2	Machine dimensions	2150L x 1100W x 2090mm(H)
3	Capacity	Max. 240 bottle per minute.
4	Drive motor	Make: HAVELLS, HP:-1, RPM:- 1390
5	Gearbox	Make: BONFIGLIOLI, Ratio: 15:1 ratio , FLANGE mounted
6	Orienter gearedmotor	Make: Bonfiglioli , H.P:- 0.125, RPM:- 24, flange mounted
7	Conveyor Gear motor	Make: Bonfiglioli, H.P.:- 0.25, RPM: 50, flange mounted
8	M/C Frame	MOC : SS-304
9	Covers & Panels	MOC : SS-304
10	Pneumatic cylinder	Make: SMC, with Solenoid valves make:-SMC
11	Capping head assly	MOC : SS-304, Al. and plastics
14	Star wheels	Rotating star wheels for movements of bottles MOC- UHMWPE
15	Cap feeder	Cap orienter device MOC: Polycarbonate + Al. + ss-304
16	Feed worm	Provide pitch to containers to match with infeed turret, MOC: Delrin
17	Chute	To convey & place the cap to cap transfer turret. MOC : SS-304
18	Proxy Switch and photo sensor.	INDUCTIVE, Photo sensor:- PNP/NO Spec: PNP/NO
19	Conveyor chain	MOC: Delrin- MCC/ HABASIT
20	Leveling bolt	m-16x100 long MOC-SS-304

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5.3 MATERIAL OF CONSTRUCTION:

S.No.	DESCRIPTION	MOC SPECIFIED
1	Cam	SG Iron
2	Cam Follower	Standard Bearing
3	Star wheel	UHMWPE
4	Feed worm	Delrin
5	Conveyor chain	Delrin
6	Door frame	Aluminum
7	Cap Orienter	SS-304, Polycarbonate, Aluminum
8	Conveyor channels	SS-304
9	Cap chute	SS-304
10	CAPPING HEAD ASSY.	SS-304, Aluminum, Plastic

5.3 Utility Details:

S.No.	Utility	Supply
1.	Electrical Supply	Phase: 3 Phase, Voltage: 415 V AC, Frequency: 50 Hz
2.	AIR SUPPLY	CONSUMPTION: COMPRESSED AIR @ 6kg/cm ² , free air, QUALITY: Oil, water & dust free. Flow pressure : 4 kg/ cm ²

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6.0 COMPLEMENTARY ASPECTS:

6.1 Training

S.No.	Specification	SYSTEM REQUIREMENTS
1	The vendor Shall supply all available information for the adequate exploitation of equipment. For the Compliance of this purpose at the Job site and/ or at the Vendors Shop. Vendor's technical staff shall train customer's personnel. The scope of the Training will be agreed during the contract signature.	YES
2	The supplier is to include the personnel training activities. The supplier is to specify the foreseen time for: <ul style="list-style-type: none"> • Operator/Supervisor training • Manager Training • Electrical maintenance training • Mechanical Maintenance training 	YES

6.2 Pre Delivery Qualifications (FAT)

S.No.	Specification	SYSTEM REQUIREMENTS
1	The System or its parts as provided for in the scope of supply shall be pre-installed at the vendors shop prior to delivery to customer site. Installation will be completed and documented including mechanical parts as well as electrical connections of all parts to facilitate taking over tests at Vendors shop prior to delivery.	YES

6.3 Supplier Technical Documentation Requirements:

S.No.	COMPONENTS	REQUIREMENTS
1	Technical Documents	FAT,IQ,OQ Electrical Drawing P & ID diagram GA diagram Calibration certificates of instruments Hydro test certificates Bought out components detail and certificates MOC certificates



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6.4 Technical Manuals

S.No.	Specification	Requirements
1.	Operation manual 01 copy	

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7.0 SAFETY AND ENVIRONMENTAL PROTECTION:

S.No.	Specification	Requirements
1.	Environment	NA

7.1 Safety features

1.	Door	<ul style="list-style-type: none"> ● Both the Doors do not open concurrently ● Doors do not open until the required temperature in the chamber is attained ● Doors do not open during the process. ● Doors do not open until room pressure is attained in the chamber
2.	Emergency off	<ul style="list-style-type: none"> ● Machine should stop immediately.
3.	Operational Safety	<ul style="list-style-type: none"> ● Emergency off ● Air Pressure low ● Power failure ● Door open

7.2 List of Audio /Visual Alarms and Interlocks:

S.No.	List of alarms	Results
1.	Emergency	Alarm sounds HMI displays “Emergency”
2.	Air Pressure low	Alarm sounds HMI displays “Air Pressure Low”
3.	Power Failure	Alarm sounds HMI displays “Power failure” It restarts

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8.0 CLEANING MAINTENANCE AND SERVICE

S.No.	Specification
1.	In accordance with cGMP guidelines the units must be easy to clean, to disinfect, and where necessary.
2.	The Supplier should guarantee that, if required, a service team can be on site within one working day.
3.	The design should be such as to allow mechanical cleaning of the surface and that the cleanliness of the surface can be checked easily.
4.	All machine parts, in particular instrumentation, should be constructed so that they can be easily removed and calibrated.
5.	All special tools required for running and maintenance should be best.
6.	A spare parts delivery guarantee with in time.

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9.0 RULES AND REGULATION:

These standards, recommendation and requirements are considered the minimum. Specifications that are more stringent or expansive take the precedence. In case of conflict between published requirements, final determination is the responsibility of the Owners Representative

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10. SCOPE OF DELIVERY

S.No.	Specification	Requirements
1.	Units described in the specific system requirements including all necessary controls and instrumentation.	YES
2	The complete mechanical and electrical installation.	YES
3	The Connections to all the necessary utilities, exhaust, and waste lines necessary for its operation.	Yes
4	All piping and cabling of the units itself.	YES
5	Wiring and cable run: all wiring and cable run is part of the supply. Site will supply the main power switches to be located in correspondence to the electrical and control cabinets delivered by the equipment supplier.	YES
6	All internal contacts of the supplied equipment for the required utilities.	YES
7	Unload on site of the equipment: the supplier is required to define all the necessary handling devices required to the unloading operation. The supplier will inform at least 4 weeks in advance the day of delivery and the list of required handling devices.	YES
8	Assembling operation: the required consumable, the internal transportation, the assembling tools and the required personal are part of the supply.	YES
9	A complete set of commissioning spare parts.	YES
10	All special tools necessary for use and maintenance of the supplied equipment.	YES
11	A complete set of two years spare parts should be listed quoted and offered as option.	YES
12	All test activities as specified in this document.	YES
13	Training in the use and maintenance of the equipment.	YES
14	A complete set of documentation as specified In this document.	YES

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11.0 INSTALLATION, COMMISSIONING AND TESTS:

11.1 General

S.No.	Specification	Requirements
1.	The Supplier must specify for each piece of equipment the Guaranteed performance and the guaranteed system performance. These values will be tested during the acceptance tests.	YES
2	In addition the functionality described in the user requirements and detailed in the system specifications will be tested.	YES

11.2 INSTALLATION, COMMISSION:

S.No.	Specification	Requirements
1	The commissioning tests will be carried out in accordance with a written test plan developed by the supplier with clearly stated test procedures and acceptance criteria.	YES
2	The supplier will approve successfully completed tests and will specify items requiring additional work. Representatives from site. Will attend and participate in the commissioning tests as required.	YES
3	The installation and commissioning of the system will be performed at the site. Facility by the supplier.	YES
4	The commissioning can only start once all the foreseen documents have been delivered by the supplier to site.	YES
.5	All equipment should be properly installed, adjusted, leveled, tagged, and connected with utilities.	YES
6	Point to point checks on wiring and pneumatic should be performed.	YES
7	All instruments should be properly calibrated.	YES
8	An equipment (instrument) used for qualification must be listed and approved by site.	YES
9	The calibration equipment must have all the necessary documents to demonstrate their maintenance & use.	YES
10	The last calibration of all this equipment must be less than 6 months old, and evidenced by certificate.	YES
11	Verification that the interior surfaces of equipment are free of practices and dirt and all points of product contact meet the specified material requirements.	YES



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12	All the clearances and tolerances specified in the drawing or recommended by component manufacturers are correct.	YES
13	On site verification that valves and other equipment with moving parts are in their normal position if in a power down condition and move in the correct direction with the correct speed and precision.	YES
14	Verification that all the Input and Output points are connected and labeled according to the documentation and that all the along the input values have been scaled in accordance with the system specification and process requirements. That all equipment components requiring configuration	YES
15	The commissioning should demonstrate that the system supplied by the supplier has been properly installed and that the functions are in accordance with site. User Requirements specifications, Vendors System specifications Manuals and other Documentation.	YES

11.3 Site Acceptance Test (SAT)

S.No.	Specification	Requirements
1.	This test will be carried out once the commissioning will be completed. The scope will be to verify the performance and the functionality of the system integrated with the other factory systems.	YES
2	The test will be carried out to verify the system response with the expected productivity of the system.	YES

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12.0 QUALIFICATION / VALIDATION:

S.No.	Specification	Requirements
1.	The maintenance Qualification is responsibility of the customer. However, the supplier is responsible for delivering the basic documents for maintenance qualification.	YES
2.	This includes all side costs such as: calibration measuring equipment and instruments: manpower (IQ and OQ will take place completely on site.)	YES
3.	Time Schedule for IQ/OQ execution will be developed by site. With the supplier.	YES
4.	Suppliers personnel used for IQ/OQ must be well trained and experienced. This should be documented.	YES
5.	The onsite test run performed by the supplier might become part of the IQ.	YES
6.	Main IQ/OQ steps such as calibration must be performed and documented in accordance to a SOP approved by site.	YES



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S.No.	Specification	Requirements
7.	All equipment used for qualification must be listed and approved by site. The calibration equipment should be well documented.	YES
8.	The last Recalibration of all this equipment should be less than 06 month old. Proofed by Certificate.	YES
9.	OQ can only start after IQ approved by site.	YES
10.	IQ will be carried out by site. During Installation phase. IQ will include the tests performed by the supplier.	YES
11.	Part of the OQ will be carried out by site. During commissioning and SAT phase. OQ will include the tests performed by the supplier.	YES
12.	After installation of the equipment at customers site. Complementary IQ & OQ tests will be performed by the Customer and may be supervised by a member of Technical staff.	YES
13.	Qualification documents (In case of equipments/Instruments)	DQ, IQ, OQ, MOC and Test certificate

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13.0 GAURANTEE/WARRANTEE

S.No.	Specification	Requirements
1.	The System must be guaranteed including all the sub- system and components for a period of 12 months from the date of the system acceptance for a 03- shift operation.	YES
2	The servicing companies involved for the Sub- systems maintenance must be declared and the maintenance group organization described. Furthermore, the supplier will be directly responsible of the system assistance and the required operation will be co- ordinate by him.	YES
3	In case of failures, the intervention will be guaranteed by the supplier within a maximum time limit. The supplier is asked to specify the maximum time limit.	YES
4	The supplier is asked to propose as option maintenance and assistance contract after the guarantee expiration.	YES

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14.0 Deviation

15.0 Annexure

16.0 Summary and Conclusion

17.0 Approval of Design Qualification:

Functional area	Name	Signature	Date
Head Engineering			
Head Manufacturing			
Head Quality			

18. Acceptance By vendor

Name of Vendor:

Sign/Date: