



**DESIGN QUALIFICATION PROTOCOL CUM REPORT
FOR
MULTI-MIX MANUFACTURING PLANT**

PROTOCOL No.:

**DESIGN QUALIFICATION
PROTOCOL CUM REPORT
FOR
MULTI-MIX MANUFACTURING PLANT**

DATE OF QUALIFICATION	
SUPERSEDES PROTOCOL No.	NIL



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1.0 PROTOCOL PRE- 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)			



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2.0 OBJECTIVE:

- To prepare the Design Qualification on basis of Specification, Purchase Order and information given by Supplier.
- To ensure that all Critical Aspects of Process/Product Requirement, cGMP and Safety have been considered in designing the equipment and is properly documented.

3.0 SCOPE:

- The Scope of this Qualification Document is limited to the Design Qualification for Multi mix manufacturing plant with Model MP 500 procured Propack Technologies Pvt. Ltd. for the equipment used to manufacture Toothpaste/Multi mix/cream.
- The equipment shall operate under the dust free environment and conditions as per the cGMP requirements.
- The drawings and P & ID's provided by Vendor shall be verified during Design Qualification.



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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:

DEPARTMENTS	RESPONSIBILITIES
Quality Assurance	<ul style="list-style-type: none"> • Preparation, Review and Approval of the Protocol cum Report. • Assist in the verification of Critical Process Parameter, Drawings, as per the Specification. • Post Approval of Qualification Protocol after Execution. • Co-ordination with Production and Engineering to carryout Design Qualification. • Monitoring of Design Qualification Activity.
Production	<ul style="list-style-type: none"> • Review of the Protocol cum Report. • Assist in the verification of Critical Process Parameter, Drawings, as per the Specification. • Post Approval of Qualification Protocol after Execution
Engineering	<ul style="list-style-type: none"> • Review of the Protocol cum Report. • Assist in the Preparation of the Protocol cum Report. • To co-ordinate and support the Activity. • To assist in Verification of Critical Process Parameter, Drawings, as per the Specification. <ul style="list-style-type: none"> • GA Drawing • Specification of the sub-components/ bought out items, their Make, Model, Quantity and backup records / brochures. • Details of utilities • Identification of components for calibration • Material of construction of all components • Brief Process Description • Safety Features and Alarms • Post Approval of Qualification Protocol after Execution



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5.0 PROJECT REQUIREMENTS:

To confirm the safe delivery of the equipment from the supplier Site. To ensure that no un-authorized and/or unrecorded design modification shall take place.

If at any point in time, any change is desired in the mutually agreed design, change control procedure shall be followed and documented.

The Multi mix manufacturing plant with Model MP 500 is meant for manufacturing of Toothpaste /Multi mix/creams/as per cGMP requirement.

6.0 BRIEF PROCESS DESCRIPTION:

To design and manufacture multi mix plant for processing of Ointment/Cream/Gels/Lotion as per product safety, cGMP guideline and to provide assurance that the equipment is manufactured as per the URS and it complies with the scope of supply.

1. Multi mixer manufacturing vessel
2. Wax phase vessel
3. Transfer pump
4. Electric control panel
5. Vacuum pump
6. Utility system
7. Batch storage vessel working platform
8. Homogenizer
9. Meter in jump

Multi Mixer manufacturing vessel:

It consists of cylindrical shell and jacketed vessel. It is fitted with the top mounted SS 316 shaft with anchor having baffles and Teflon scrappers moving in a clockwise direction. One more baffles system is mounted in the inner side of the vessel. The vessel is provided with pressure release vent, safety valve rupture disc, gauge and a temperature sensor with digital display. The vessel is provided with bottom homogenizer and unloading of finished product to storage vessel using lobe pump. The vessel is also provided with steam and cooling water to the jacketed tank. The vessel is also provided with light glass, sight glass, charge hole and hand hold on top dished end.

High speed homogenizer is installed at the manufacturing vessel. It is a silverson type homogenizer and consists of slit sleeve type SS 316 blade and rotates at 2800 RPM.



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Wax phase Vessel:

It is fitted with bottom mounted stirrer coupled to SS 316 shaft with agitator, pressure gauge, vent valve, safety valve rupture disc, and a temperature sensor with digital display. It is provided with bottom outlet connected to manufacturing vessel through a conical filter having SS mesh screen of 100# filter of melted waxes. It is also provided with the steam supply to the jacket.

Utility system:

A utility pendant is provided to bring the utility lines from the service floor to the platform so as to run the utility line below the platform.

There is a manual mode of operation for manufacturing plant-500 kg. For manual mode selector switches are provided on control panel to control the parameter.

- Water inlet : 1" dia. TC flanged end.
- Water outlet : 1" dia. TC flanged end.
- Cooling water inlet : 1" dia. TC flanged end.
- Cooling water outlet : 1" dia. TC flanged end.

7.0 EQUIPMENT SPECIFICATION (URS):

Equipment Specification is a document provided to manufacturer for engineering equipment as per the specifications.



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8.0 CRITICAL VARIABLES TO BE MET:

8.1 PROCESS/PRODUCT PARAMETERS:

CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
<p>Application: The Multi-Mix mfg. Plant should be able to Manufacture cosmetic / Lotions / Creams & Gel</p>	<p>Multi-Mix mfg. Plant should meet the requirement for Manufacture Multi mix / Lotions / Creams & Gel ointment. (To be assured by Supplier).</p>	<p>Process & cGMP Requirement</p>
<p>Working: Working of Multi-Mix manufacturing Plant</p>	<p>Working is Vibration Free & free from any unwanted sound.</p>	<p>Process Requirement</p>
<p>Electrical Control Panel</p>	<p>The system should have Electrical Control Panel.</p>	<p>Design & Process Requirement</p>
	<p>AC Frequency Controller (For 5 HP Anchor Agitator.(FLP))</p>	
	<p>AC Frequency Controller(for 10 HP High shear Emulsification Head(FLP))</p>	
	<p>DOL Starter (For 2 HP Wax Phase Agitator(FLP))</p>	
	<p>DOL Starter (For 2 HP Water Phase Agitator(FLP))</p>	
	<p>DOL Starter (For 3 HP Vacuum Pump)</p>	
	<p>DOL Starter (For 2 HP Transfer Pump(FLP))</p>	
	<p>DOL Starter (For 1HP Power Pack(FLP))</p>	
	<p>DOL Starter (For 1HP meter in Pump(FLP))</p>	
	<p>Emergency OFF (For Safety and Emergency).</p>	
<p>Indication Lamp (For Main ON and Equipment ON)</p>		



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8.2 UTILITY REQUIREMENTS / LOCATION SUITABILITY :

CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
Utility connections should be available as per the manufacturer's specification.		
Electrical Supply	3 Phase Plus Earthing, 5 Wire Line Up To The Panel Board Terminal. Voltage- 440 ± 10% V -18.5 HP Frequency- 50 ± 3% Hz (To be assured by Engineering Department)	cGMP & Design Requirement
Steam	¾" BSP Header at 3 Kg.cm ²	Process Requirement
Cooling Water	1 ½" BSP Header at 7000 Ltrs./Hr	Process Requirement
Service Water	¾" BSP line at 2 Kg./cm ² pressure for cleaning	Process Requirement
Room Condition	Temperature: NMT 25 °C RH: NMT 55%	Process Requirement



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8.3 TECHNICAL SPECIFICATIONS / KEY DESIGN FEATURES:

CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
Equipment	<ul style="list-style-type: none"> Multi-Mix Plant 	Supplier
Model No.	<ul style="list-style-type: none"> MP 500 	Design Requirement
Working Capacity	<ul style="list-style-type: none"> 500 Kg 	Process Requirement
Manufacturing Vessel	<ul style="list-style-type: none"> Qty : 1 Nos. Working: 600 Liters. Gross : 750 Liters 	Design & Process Requirement
	Manufacturing Vessel	
	<ul style="list-style-type: none"> Shell: 6 mm thick SS 316L Cylindrical type. Bottom: 7 mm thick SS 316 L conical bottom end type welded with shell. TOP: 6 mm thick SS 316 L torrispherical dish end type welded with shell. Flanges: 16mm thick SS 316 L-2 No. welded. Jacket: 5 mm thick cladding, spiral type stiffener for uniform heating & cooling. “O” Ring: silicon food grade. Insulation: 50 mm thickness Rockwool, 14 SWG SS304. Legs: SS 304 pipe-3 Nos. 	
	Vessel Connection on Top Dish End:	



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CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
	<ul style="list-style-type: none"> • CIP Connection: 40 mm dia. TC with flexible hose & pneumatic operated butterfly valve and common pipe line. • Ingredient suction: 40 mm Dia TC with flexible hose & pneumatic butterfly valve. • Compound gauge: 25mm Dia TC with compound gauge qty. 1 No. • Safety valve: 25 mm Dia TC with safety valve qty: 1 No. • Additive hopper: 25 mm Dia. TC with manual butterfly valve and funnel-2 Ltrs. • Vacuum Inlet: 40 mm Dia.TC with pneumatic operated butterfly valve and NRV. • Stirrer: mounted on center of the dish. <p>Vessel Connection on side of the Top shell :</p> <ul style="list-style-type: none"> • Wax inlet: 25 mm dia. with pneumatic operated butterfly valve. • Water inlet: 25 mm dia. with pneumatic operated butterfly valve. • Recirculation: 40 mm dia. TC with pneumatic operated butterfly valve. <p>Vessel connection on bottom of the vessel:</p> <ul style="list-style-type: none"> • Outlet: 40 mm dia. TC with pneumatic operated radial diaphragm valve. • Product Sensor: 1/2” BSP coupling with 6 mm P.T.-100 with temperature sensing probe. <p>Vessel Design:</p> <ul style="list-style-type: none"> • Temperature: 4 °C to 150°C • Working Temperature: 4 °C to 123°C. • Pressure: -1 to 2 kg/cm • working Pressure: -1 to 1 kg/cm. <p>Jacket Connection:</p>	<p>Design & Process</p>



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	<ul style="list-style-type: none">• Steam Inlet/cooling outlet: 25mm TC with pneumatic operated piston valve.• Steam Outlet/cooling inlet: 25mm TC with pneumatic operated piston valve.• Safety valve, Pressure gauge & Air vent: 25 mm TC <p>Jacket Design:</p> <ul style="list-style-type: none">• Temperature: 4 °C to 180 °C.• working temperature: 4 °C to 150 °C• Pressure: -1 to 4 kg/cm².• Working pressure: -1 to 3 kg/cm². <p>Agitator details:</p> <p>Agitator design: provided with semi contra design anchor and paddle made from SS 316 plates with holes and also have PTFE scrapper floating type.</p> <p>Stationary baffles: 2 Nos stationary baffles for breaking the mass movement & pushing the mass on center.</p> <p>Motor: 5 HP/415V/1500 RPM(FLP)</p> <p>Gear box: w110-ration 20:1</p> <p>Speed variator: frequency controller is provided for vary speed. 5 to 48 RPM.</p> <p>Shaft seal: single cartridge mechanical seal.</p> <p>High shear emulsifier head details:</p>	Requirement



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	<ul style="list-style-type: none">• HSEH Design: specially designed HSEH with rotor and stator principle for breaking mass into micron size particles.• Mounting: bottom of the vessel in conical portion.• Motor: 10 HP. 2800 RPM/ 415V (FLP).• Speed variator: frequency controller is provided for vary speed. 1000 to 2800 RPM.• Shaft seal: double cartridge mechanical seal with TC/TC seal face, with cooling water arrangement for the mechanical seal and an electronic water detection sensor to trip the motor if the flow of water to the mechanical seal is stopped, ensuring through safety of the seal.• Safety: thermosyphon system it is possible to supply barrier fluid to double seal arrangement. the pressure of barrier fluid is higher than the pressure of the fluid being sealed. thus seal faces remain in contact with each other and sealing area temperature is controlled. Thermosyphon system is as per API 682. <p>Vessel Finish:</p>	



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	<ul style="list-style-type: none">• Weld details: Vessel will be argon arc welded.• Internally: <0.8 Ra – mirror polish. (Mirror polish)• Externally: <1 Ra – satin matt polish for shell and top dish and bottom cone with leg with mirror finish. <p>Hydraulic lifting arrangement with hydraulic power pack unit :</p>	Process Requirement



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	<p>Consist of heavy duty cylinder with a lifting up to 2' Ht & lifting capacity of 1000 Kgs. power pack unit comprising of rex rorth pump, European make solenoid valve, RLF, Baumer pressure gauge, breather, hitech level gauge.</p> <p>Hydraulic lifting ON, anchor 1 homogenizer should not be ON.</p> <p>Hydraulic cylinder provided with SS 304 enclosures.</p> <p>The lid of the mfg. vessel will be provided with hydraulic lifting and lowering arrangement for the top dish.</p> <p>Hydraulic lifting arrangement will consist of : Hard chrome plated guide bars with suitable retaining plates and support & hydraulic cylinders.</p> <p>Power pack assembly complete with tank 1 HP pump with filter, connected to suitable solenoid valve arrangement with direction and flow control valve for preventing drop page of pressurized fluid.</p> <p>Power pack consists with suitable connecting pipes to a hydraulic cylinder of suitable lift. Clamped to the drive to give smooth up and down transverse.</p> <p>Complete unit as above with electrical controls added in main panel.</p>	



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CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
Water phase heating Vessel	<ul style="list-style-type: none"> • Capacity : • Working: 350 Liters. • Gross : 420 Liters. • Min Batch Size: 105 Liters. • Shell: 5mm Thick SS 316L, Cylindrical type. • Bottom: 5mm Thick SS 316L, Torispherical Dish end Type welded with shell. • Top: 2mm thick SS316L with flat top, 1/3rd Open able type. • Jacket: 4 mm thick cladding , spiral type stiffeners for uniform heating and cooling • “0” Ring: Silicon food grade. • Legs: made of SS304 pipe legs 03 Nos. 	Design & Process Requirement
	Vessel Connection on Top dish end:	
	<ul style="list-style-type: none"> • CIP Connection: 25mm dia. TC provided with 1 No. for dynamic spray ball & pneumatic butterfly valve. • Stirrer: Mounted on centre of the Lid. 	
	Vessel Connection on bottom of the Vessel:	
	<ul style="list-style-type: none"> • Outlet: 25mm Dia.TC with pneumatic radial diaphragm valve. • Product Sensor: P.T. 100 with temperature indicator. 	
	Vessel Design:	
	<ul style="list-style-type: none"> • Temperature: 4 °C to 150°C • working temperature: 4 °C to 123°C • Pressure: ATM • working pressure: ATM 	
	Jacket Connection :	
	<ul style="list-style-type: none"> • Steam Inlet : 25mm TC with pneumatic operated piston valve • Steam outlet : 25mm TC with pneumatic operated piston valve • Connection for: Safety valve, Pressure gauge & Air vent is provided. 	
	Jacket Design:	



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	<ul style="list-style-type: none">• Temperature: 4° C to 180° C.• Working temperature: 4° C to 150° C.• Pressure: -1 to 4 kg/cm².• Working pressure: -1 to 3 kg/cm². <p>Top stirrer details:</p> <p>Design: specially designed to entry marine Type impeller design provided.</p> <p>Mounting: top of the vessel.</p> <p>Motor: 2 HP. 960 RPM/415V(FLP)</p> <p>Vessel finish:</p> <p>Weld details: vessel will be argon arc welded.</p> <p>Internally : <0.8 Ra – mirror polish.</p> <p>Externally: <1 Ra – satin matt polish for shell and top dish and bottom cone with leg with mirror finish.</p>	



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Wax Phase Vessel	<ul style="list-style-type: none"> • Capacity: Working: 350 Liters. • Gross : 420 Liters. • Min Batch Size : 105 Liters. • Shell: 5mm Thick SS 316L Cylindrical type. • Bottom : 5mm Thick SS 316L torispherical dish end type welded with shell. • Top : 2 mm thick SS 316L with flat top 1/3rd Open able type. • Jacket : 4 mm thick cladding , Spiral type stiffeners for uniform heating and cooling. • “0”Ring : silicon food grade. . • Jacket insulation: provided with 50 mm thick rockwool with SS304 Cladding welded type. • Legs: SS 304 pipe-3 Nos. 	cGMP & Design Requirement
	Vessel Connection on Top dish end:	
	<ul style="list-style-type: none"> • CIP connection: 25 mm dia. TC with 1 No. for dynamic spray ball & pneumatic butterfly valve. • Stirrer : Mounted on centre of the dish 	
	Vessel Connection on bottom of the Vessel:	
	<ul style="list-style-type: none"> • Outlet: 25 mm Dia. TC with pneumatic radial diaphragm valve. • Product Sensor: P.T. 100 with temperature indicator. 	
	Vessel Design:	



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	<ul style="list-style-type: none"> • Temperature : 4 °C to 150°C • Working temperature: 4 °C to 123°C. • Pressure : ATM • working pressure : ATM <p>Jacket Connection:</p> <ul style="list-style-type: none"> • Steam Inlet: 25 mm TC with pneumatic operated piston valve. • Steam outlet: 25 mm TC with pneumatic operated piston valve. <p>Connection for : Safety valve, Pressure gauge & Air vent is provided</p> <p>Jacket Design:</p> <ul style="list-style-type: none"> • Temperature: 4 °C to 180°C. • Working temperature: 4 °C to 150°C. • Pressure: -1 to 4 kg/cm • Pressure : -1 to 3 kg/cm <p>Top stirrer details:</p>	
	<ul style="list-style-type: none"> • Design: specially designated top entry saw cutter type design provided. M • Mounting: top of the vessel. • Motor: 2 HP. 960 RPM/415V(FLP) <p>Vessel finish:</p> <p>Weld details: vessel will be argon arc welded.</p> <p>Internally: <0.8 Ra – mirror polish.</p> <p>Externally: <1 Ra – satin matt polish for shell and top dish and bottom cone with leg with mirror finish.</p>	



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CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
<p>Transfer Pump (LOBE PUMP)</p>	<ul style="list-style-type: none"> • Discharge finish product from multi mixer to storage vessel. • recirculate product back into manufacturing vessel during processing product. • Type: twin lobe • Design: sanitary • Motor: 2 HP /415V/ geared motor (FLP) • Seal: mechanical seal with TC/TC seal face. • Mounting: SS304 Trolley mounted. • Output: 0.12 liters/Rev. • Inlet/outlet : 25 mm TC. • MOC: SS 316 L(product change part) 	<p align="center">Design & Process Requirement</p>
<p>Vacuum Pump</p>	<ul style="list-style-type: none"> • Type: Water Ring Type • 3 HP / 415V / 2800 RPM . • vacuum: 710 mm/hg. • Water inlet flow required: 6-8 Lit/Min • Water Temperature: Ambient. • MOC: cast iron with bronze impeller. • Mounting: MS Epoxy painted. • Vacuum holding tank: provided with 50 ltr-SS316 holding tank. 	<p align="center">Design & Process Requirement</p>



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CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
<p>Meter-in Pump</p>	<ul style="list-style-type: none"> • Purpose/Application: For feeding product from Storage Vessel to the Filling Machine Hopper. • Type: Reciprocating Plunger type, Volume adjustable. • Motor: 1 HP / 1440 RPM/ 415V(FLP) • Head 2.5 meter • MOC: SS316 L(Product contact part) • mounting: SS304 stand mounted. • Inlet: 50 mm TC • Outlet: 50 mm TC • Output: the pump will be provided with mechanical/digital metering system 10 to 100% of the output to match the output of filling machine. The pump shall be mounted in filling machine room next to filling machine. 	<p>Design & Process Requirement</p>
<p>Batch Storage Vessel</p>	<ul style="list-style-type: none"> • Working Capacity: 600 Liters • Gross Capacity: 700 Ltrs. • MOC: all contact part SS 316L. Non-contact parts SS 304. • Tank description: vessel will be cylindrical having conical bottom with flat lid on top and will be provided with 40 mm manual butterfly valve for discharge. The vessel will be mounted on SS Pipe legs and PU castor wheels. 	<p>Design & Process Requirement</p>



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8.4 MATERIAL OF CONSTRUCTION :

S.No.	PARTS NAME	MATERIAL OF CONSTRUCTION
1.	All contact Parts	SS 316L
2.	Shell	SS 316L
3.	Bottom	SS 316L
4.	Top	SS 316L
5.	Flange	SS 316L
6.	Jacket	5mm thick cladding, spiral type stiffener for uniform heating & cooling.
7.	Legs	SS 304 pipe-3 Nos.
8.	Transfer Pump (LOBE PUMP)	SS 316 L(Product Contact Parts)
9.	Meter-in Pump	SS 316L (Product Contact part)
10.	Working Platform: <ul style="list-style-type: none">• Thickness of platform 2mm SS 304• Railing is provided on all three sides of the Platform SS 304.• Legs SS 304 Legs are provided.• Ladder SS 304	SS 304



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8.5 SAFETY:

CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
MCB	MCB is provided so that when there is an overload in current or any short circuit then the MCB trips.	Safety Requirement
Mechanical Guard	Mechanical guard for all rotating parts.	Safety Requirement
Joints	Welding of joints without any welding burrs	Safety Requirement
Metal Parts	All the metal parts should be properly grounded without any sharp Edges.	Safety Requirement
Leveling And Balancing	Equipment should be properly balanced & leveled	Safety Requirement
Electrical Wiring And Earthing	Electrical wiring should be as per approved drawings. Double external Earthing to control machine (panel and motors) and operator should be provided	Safety Requirement
Noise Level	Below 80 db	Safety Requirement
Emergency Switch	Provided easy access position	Safety Requirement
Startup	When top Dish end of Multi-Mix is up then the stirrer will not start, ensuring safety for the operator.	Safety Requirement
Cooling arrangement	Cooling arrangement provided for motor shaft and seal with special flow switch to detect water, so only if cooling water is circulated then only homogenizer will operate, this ensures long life of the equipment.	Safety Requirement
Operating panel	Is provided on platform of the Equipment for operator safety.	Safety Requirement
Dimple sheet	Platform to ensure proper grip during walking and railing is provided as safety feature.	Safety Requirement

8.6 VENDOR SELECTION:

CRITICAL VARIABLES	ACCEPTANCE CRITERIA	REFERENCE
Selection of Vendor for supplying the Multi-Mix manufacturing plant.	Selection of Vendor is done on the basis of review of vendor. Criteria for review should include vendor background (general/financial), technical know how, quality standards, inspection of site, costing, feed back from market (customers already using the equipment)	Process Requirement

Reference: (1) the equipment shall confirm to the specifications and requirement as specified in PO.
 (2) Operating and service manual for **Multi-Mix manufacturing Plant**.

9.0 DOCUMENTS TO BE ATTACHED:

- Technical details for Equipment Requirement with Engineering Drawings.
- Approved Design and Specifications.
- Any other relevant documents

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

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11.0 ANY CHANGES MADE AGAINST THE FORMALLY AGREED PARAMETERS:

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12.0 RECOMMENDATION:

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13.0 ABBREVIATIONS:

- DQ : Design Qualification
- URS : User Requirement Specification
- cGMP : Current Good Manufacturing Practice
- P & ID : Piping and Instrumentation Diagram
- GA : General Agreement
- SS : Stainless Steel
- RPM : Revolution per Minute
- TC : Tri Clover
- HP : Horse Power
- Hz : Hertz
- NMT : Not more Than
- RH : Relative Humidity
- SWG : Standard water gauge
- NRV : Non Return Valve
- MCB : Miniature Circuit Breaker
- Db : Decibel
- PO : Purchase order



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14.0 REVIEWED BY:

DESIGNATION	NAME	SIGNATURE	DATE
HEAD (ENGINEERING)			

DESIGNATION	NAME	SIGNATURE	DATE
HEAD (PRODUCTION)			

APPROVED BY:

DESIGNATION	NAME	SIGNATURE	DATE
HEAD (QUALITY ASSURANCE)			