



## Kerala State Homoeopathic Co-Operative Pharmacy Ltd.

(sponsored by government of Kerala & aided by govt. of India)

Office:Pathirappally  
Alappuzha, India  
Pin-688 521

Phone : 477 2258012  
:477 2258665  
Fax : 0477 2258012

Website : [www.homcokerala.com](http://www.homcokerala.com)

Email : [homcokerala@gmail.com](mailto:homcokerala@gmail.com)

### Supplier's Copy

## USER REQUIREMENT SPECIFICATION

<b>Name of the Company</b>	:	
<b>Contact Person</b>	:	
<b>Address</b>	:	
<b>Contact Details</b>	:	
<b>Department</b>	:	<b>Ground Floor</b>
<b>Equipment and Code No.</b>	:	<b>Air-cooled Oil free Rotary screw Air Compressors Capacity: 200 cfm with compressed air pipe line</b>
<b>Name of work</b>	:	Supply, Installation, Commissioning & Validation of Air-cooled Oil free Rotary screw Air Compressors along with Air dryer, filtrations system & air receiver and control panel and all other accessories required to produce compressed air and compressed air distribution pipe line with accessories at M/s. Homco -Kerala
<b>Ref. No.</b>	:	
<b>Date</b>	:	
<b>Enclosures</b>	:	
<b>Qty.</b>	:	<b>2 nos. (2 Compressor+ 1 Air Dryer+1 Air receiver + Pipe line and accessories)</b>



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### ROTARY SCREW AIR COMPRESSOR – OIL FREE With accessories & Receiver

#### ANNEXURE - I : BASIC DETAILS OF THE MACHINE

DESCRIPTION	
(To be specified by the supplier, if any variation)	
<b>Air compressor</b>	
Scope	: Supply, Installation, Commissioning & Validation of Air- cooled Oil free Rotary screw Air Compressors along with Air dryer, filtrations system, & air receiver, control panel and all other accessories required to produce compressed air and compressed air distribution pipe line with accessories at M/s. Homco – Kerala
Equipment	: <b>Air cooled Screw Compressor – Oil Free</b> Qty. 2 nos. (Working )
Speed	: Fixed Speed * (Working)-200 cfm With VFD* (Working )-200 cfm
CFM	: 200 cfm each compressor *
Model	: *
Stage	: Single-Stage*
Minimum Working Pressure	: 5.0 bar *
Maximum Working Pressure	: 10.0 bar *
Control Mode	: Microprocessor based Control*
<b>Air cooled Refrigerated Air Dryer</b>	
Model	: *
Dryer Capacity	: 600 cfm *

\* To be specified and confirm by the supplier as per their equipment design and requirement



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## DESCRIPTION

(To be specified by the supplier, if any variation)

Maximum Working Pressure	:	7 to 16.0 bar *
Maximum Operating Pressure	:	8.0 bar *
Pressure Dew Point	:	3 to 5 Deg. C*
Nominal Ambient Temperature	:	35 Deg. C*
Nominal inlet Air Temperature (Max)	:	45 Deg. C (60 Deg. C) *
<b>Air Compressor</b>		
Operating Principle	:	<ul style="list-style-type: none"><li>The single stage oil free compressor, to be direct geared drive coupled to high efficiency motor with flexible coupling. *</li><li>Global design philosophy for energy efficiency and ergonomics. *</li><li>Special coating concept for rotor and anodized rotor housing to gives advantage of high performance, long life and minimal leakage losses. *</li><li>The entire package designed should be considering the typical temperatures that are encountered in the oil free screw compressors. *</li><li>Precisely designed timing gear positioned at discharge side and is to be driven through the male rotor*</li><li>The rotors should be sealed from oil side of bearings and gears using labyrinth seals *</li><li>Floating type metal seal should be used to prevent air and water leakage from compressor chamber *</li></ul>
Components and Construction	:	<p>The compressor should include the following components:</p> <ul style="list-style-type: none"><li>After cooler and water cooler *</li><li>Moisture separator *</li></ul>

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<b>DESCRIPTION</b>	
(To be specified by the supplier, if any variation)	
	<ul style="list-style-type: none"> <li>• Water filter *</li> <li>• Suction filter *</li> <li>• Base frame *</li> <li>• Sound proof cover *</li> <li>• Integral lubrication system built within the airend*</li> <li>• Intake valve *</li> <li>• Solenoid valve *</li> <li>• Discharge pressure safety valve *</li> <li>• Discharge check valve *</li> <li>• Set of instrumentation as per above list *</li> <li>• Anti-Vibration mountings *</li> <li>• Control panel with starter *</li> </ul>
<b>Salient features</b>	<p>∴ Air compressor should have the following features:</p> <ul style="list-style-type: none"> <li>• No RO or any other form of water purifying system *</li> <li>• Auto water replenishment mechanism *</li> <li>• Usage of roller bearings as against hydrodynamic bearing eliminates need for water pump *</li> <li>• Low load on drier due to lower package discharge temperature *</li> <li>• FDA approved stainless steel rotors with proprietary coating eliminates corrosion *</li> <li>• Non-contact of rotors enables longer air end life *</li> <li>• Food grade approved hard anodized aluminum housings with stainless steel inserts in bearing location eliminates corrosion *</li> <li>• Corrosion should be totally avoided by stainless steel or coated surfaces in the entire air and water path *</li> <li>• 3-layer sealing solutions that ensures 10% security against oil entering the chamber *</li> </ul>

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## DESCRIPTION

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### General purpose Filter

Grade G (Pre filter)	:	General purpose filter
Filter	:	Should be 1 micron coalesced liquid water & oil, to provide maximum remaining oil aerosol content of 0.5 mg/m <sup>3</sup> @ 21 <sup>0</sup> C *
Grade H (Fine filter)	:	High efficiency Oil removal filter *
Filter	:	Should be 0.01 micron including coalesced liquid water & oil aerosol, providing maximum remaining oil aerosol content of 0.01 mg/m <sup>3</sup> @ 21 <sup>0</sup> C *

### Vertical Air receiver

Capacity	:	3000 L *
MOC	:	IS:2062 *
Design Code	:	IS:2825 *
Working Pressure	:	12.5 kgs/cm <sup>2</sup> *
Standard Fittings (As per latest industrial requirement)	:	<ul style="list-style-type: none"><li>• Pressure safety valve (Spring loaded, Open Bonnet, Pop type) *</li><li>• Pressure gauge with isolation valve 4" dial*</li><li>• Timer Based auto drain valve*</li></ul>

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## ANNEXURE – II : cGMP FEATURES

<b>DESCRIPTION</b>		
(To be specified by the supplier, if any variation)		
Working Area Environment	:	Temperature : 27±2°C
	:	Relative Humidity: 75±5%
Finish	:	Internal: *
	:	External: *
The equipment should be smooth finished without any sharp edges and crevices.		
<b>MOC</b>		
<b>Lubrication</b>		
Oil Pump	:	Positive displacement, 2 shaft, gear type*
Oil Filter	:	Spin-on, single element paper – 4-micron nominal*
Pressure Relief	:	25 psid differential, Cast Aluminum*
<b>Base Plate</b>		Fabricated Steel*
<b>Main Drive Motor</b>		
Frame	:	Cast Iron *
Windings	:	100% Copper*
Insulation	:	Class F *
Bearings	:	Vacuum degassed ball bearings *
<b>Screwed Pipe Assemblies</b>		
<b>(2" And smaller)</b>		2"NB ANSI B16.5 150# Flange. *
Materials Piping	:	*
Material Fittings	:	*

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## ANNEXURE - III : PROCESS CONTROL FEATURES

DESCRIPTION
(To be specified by the supplier, if any variation)
<b>Starter / Control Panel:</b>
<ul style="list-style-type: none"><li>➤ Compressor to be supplied with a star / delta starter*</li><li>➤ Starter to be automatic and to be controlled by controller *</li><li>➤ Standard electrical/electronic components contained within a starter box to include: Control circuit transformer and cooling fan motor circuit breaker. *</li><li>• Star-delta compressor motor starter, with auxiliary contacts and overload relays. *</li><li>• Cooling fan manual motor starter and circuit breaker for fan motor or fuses. *</li><li>• Power supply board*</li><li>• Main motor overload relay. *</li><li>• Control relay control transformers and fuses. *</li></ul>
<b>Controllers</b>
The compressor should monitor, controlled and protect by Neuron IV microprocessor controller, which continuously monitor status of the compressor and should take action if abnormal operating conditions occur. The controller should include the following: *

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### DESCRIPTION

(To be specified by the supplier, if any variation)

- Display: High resolution LCD display and LED status visualization icons. \*
- Easy user interface TFT display and intuitive menu in menu icon \*
- 30-day reports (load hours, unload hours, run hours, stop hours etc.) History for last 99 events. \*
- Remote functions (both from MODBUS as well as digital input) \*
- 32 pressure programs scheduled from (first day of the week 00:00 Hrs.) \*
- PC interface through MODBUS- to download reports and setting parameters \*
- The smart logic automatically decides the start delay required to ensure minimum wait time between successive starts of the compressor and dryer thereby increasing their lifetime \*
- Low voltage and short time power interrupts detection to enhance the life of the contactors \*
- Low temperature start inhibits to avoid start-up overloads \*
- Compatible with modern communication topographies like DCS & SCADA \*
- Provides faster communication using channels like RS485 on MODBUS, Ethernet \*
- Master /Slave controls on MODBUS (RS 485) through Uptime manager \*
- On Board input / Outputs (I/O) – 16 to accommodate 8 Digital Inputs & 8 Digital Outputs \*
- Capability to expand and support additional 8 I/O modules \*
- Alarm & Trip for pressure & temperature overrun. Warning for consumable changes \*
- Provision for entering Latitude and Longitude for identify the machine location \*
- Remote start/stop and load /Unload \*
- Run hour report for different speeds and integration of VFD parameters \*
- IP55 protected on front panel An AB series compressor consists of the following component \*

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## ANNEXURE - IV : OPERATIONAL FEATURES

<b>DESCRIPTION</b>		
(To be specified by the supplier, if any variation)		
<b>Air compressor</b>		
<b>Performance</b>		
Delivered Flow (1)	:	195 cfm *
Delivered Flow (2)	:	195 cfm *
Minimum Working Pressure	:	5.0 Bar (g) *
Maximum Working Pressure	:	10.0 Bar (g) *
Compressor Package Power @ 10.0 bar g	:	--- kW *
Compressor Offload Power	:	--- kW *
<b>Cooling Data Air Cooled</b>		
<b>(Max. Temp Amb. 46°C)</b>		
CTD of Compressed Discharge Air (2)	:	Ambient Temp + 10 °C (Max) *
Air Cooling Flow	:	--- m <sup>3</sup> /min *
Fan Absorbed Power	:	-- kW *
Cooling Air ΔT approx.	:	---°C *
<b>Sound Level (4)</b>		
Sound Pressure (1)	:	72 ±3 dB (A) ISO 2151 *
Sound Pressure (2)	:	72 ±3 dB (A) ISO 2151 *

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## DESCRIPTION

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### Scope of Supply Should Include:

#### Air Compressor:

- Should be single stage, oil free complete compressor package, pre-piped and wired, ready for operation. \*
- The compressor should meet standards for performance, efficiency, safety, reliability, sophistication and aesthetics. \*
- The Compressor should engineered to run continuously round the clock and round the year with a few mandatory checks and very minimal change of consumables. \*
- Machine availability for plant operation should be with minimal maintenance stoppage. \*
- Should give maximum delivery utilizing optimum power and delivers oil free air for its life. \*
- Should be directly driven with coupling and bull gear\*
- Main motor and fan motor should be insulated with class F windings and IP55. \*

#### Motor:

- The motor should be manufactured by an energy efficient Effi meeting industry standard TEFC (totally enclosed fan cool) with IP 55 protection \*
- The motor should be supported by Anti Vibration mounts to avoid vibration of the package to be transmitted to other parts of the compressors. \*

#### Intake Valve:

- Compressors should be fitted with Mono-Block type normally closed intake valve at the inlet. \*

#### Cooler:

- Compressors should be with air cooled after and water coolers. \*
- The coolers should have extended surface Aluminum tubes to have the best heat transfer capability. \*
- The coolers should design for
  - Better heat dissipation \*
  - Easy maintainability \*
  - Compact design \*

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## DESCRIPTION

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### Canopy:

- Compressor should be housed in acoustic enclosure designed by Industrial designers to meet pollution control norms and safety and health standards. \*
- The aesthetically appealing canopy should control and safeguards the compressor against dust, temperature and Industrial pollutants and ensures smoother operation \*

### Moisture Separator:

- Should be constructed by Aluminum moisture separator with zero loss, integrated auto drain valve \*

### Air / Water Separator Tank:

- Stainless steel (SS 304) separator tank should be used to separate the air and water using WSBIC separation (cyclonic separation) \*
- An additional stainless-steel mesh should be provided to further remove the water mist and deliver water free air \*
- All inter-connecting water lines are of stainless-steel material should be use to eliminate the contamination and corrosion \*

### Safety And Interlocks:

- Discharge Air pressure \*
- Water differential pressure \*
- Air filter differential pressure \*
- Discharge temperature \*
- Water temperature \*
- Oil temperature \*
- Water level (high & low) switch \*
- Safety Valve \*
- OLR (Main motor /fan motor) \*

### Gear Box Lubrication:

- Compressors should have lubrication system for gears and bearings. \*

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### ANNEXURE - IV

### Air Distribution pipe line

DESCRIPTION		
( To be specified by the supplier, if any variation)		
Description	Qty.	Unit
<b>DISTRIBUTION PIPES &amp; FITTINGS:</b>		
Supply, installation, testing & commissioning of following items for Non-lubricated Air supply with all required items at site.		
<b>PIPE :</b>		
Rigid aluminium pipe (ISO 8573-1) for 16 bar pressure , Working Temperature: -20 Degree Centigrade up to + 80 Degree Centigrade. Interconnection piping for compressor and dryers, with push fit accessories made of aluminum alloy as per the OEM standards like bends, tee, flanges ,reducers, adaptor etc.		
50.1 X 45.7 Mm X 6 Mtr	258	mtr
40.1 X 36.5 Mm X 6 Mtr	24	mtr
25.1 X 22.5 Mm X 6 Mtr	324	mtr
<b>Accessories ( For Main Header , Sub header line )</b>		
<b>Connector</b>		
Pipe to Pipe Connector DN 50	33	Nos.
Pipe to Pipe Connector DN 40	1	Nos.
Pipe To Pipe Connector DN 25	40	Nos.
<b>Elbow (Equal 90 Degree)</b>		
DN 50 MM	35	Nos.
DN 40 MM	6	Nos.
DN 25 MM	36	Nos.

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<b>DESCRIPTION</b>		
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<b>Description</b>	<b>Qty.</b>	<b>Unit</b>
<b><u>Equal Tee</u></b>		
DN 50 MM	10	No.
DN 25 MM	3	Nos.
<b><u>Reducing Tee</u></b>		
50 x 40 MM	3	Nos.
40 x 25 MM	1	No.
<b><u>Adopter</u></b>		
Male Thread Adaptor 50 x 2"	8	Nos.
Male Thread Adaptor 40 x 1 1/2"	2	Nos.
Female Thread Adaptor 25 x 1"	4	Nos.
<b><u>Reducer - Reducing pipe to pipe connector</u></b>		
40 x 25 MM	1	No.
<b><u>End Cap</u></b>		
DN 50 MM	6	Nos.
DN 25 MM	11	Nos.
<b><u>Quick Plug Valve</u></b>		
50 MM	15	Nos.
40 MM	3	Nos.
25 MM	11	No.
<b><u>Flexible Pipe Clip</u></b>		
50 MM	117	Nos.
40 MM	12	Nos.
25 MM	178	Nos.

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<b>DESCRIPTION</b>		
( To be specified by the supplier, if any variation)		
<b>Description</b>	<b>Qty.</b>	<b>Unit</b>



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<b><u>Quick Drop</u></b>		
50.1 X 25.1 MM	11	Nos.
Quick Drop: 25.1 X 1/2" Female	44	Nos.
Quick Drop: 50.1 X 1/2" Female	8	Nos.
Quick Drop: 50.1 X 3/4" Female	2	Nos.
<b><u>Wall Mounted Bracket</u></b>		
300 MM	21	Nos.
1200 MM	101	Nos.
<b><u>Threaded Steel Rod</u></b>		
3000 MM	97	Nos.
<b><u>SS flange female thread</u></b>		
DN 80 X 2"	2	Nos.
Pressure Gauge 4"	6	Nos.



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<b>DESCRIPTION</b>		
( To be specified by the supplier, if any variation)		
<b>Description</b>	<b>Qty.</b>	<b>Unit</b>
<b><u>Tapping in Production Area</u></b>		
Supply, installation, testing and commissioning of following size stainless steel pipe for 16 bar pressure made of SS316 material Interconnection piping with press fit accessories made of SS316 as per the OEM standards like bends, tee, flanges ,reducers, adaptor etc.		
DN 25	18	Mtr
DN 20	303	Mtr
<b><u>Accessories</u></b>		
<b><u>Elbow</u></b>		
DN 25 SS 316 equal elbow press fit type	6	Nos.
DN 20 SS 316 equal elbow press fit type	132	Nos.
<b><u>Tee</u></b>		
DN 20 SS316 Tee press fit type	13	Nos.
<b><u>Pipe to Pipe joint - Press fit</u></b>		
DN 25	1	No.
DN 20	25	Nos.
<b><u>Thread joint - Press fit</u></b>		
DN 25 : 1" Male	8	Nos.
DN 20 : 1/2" Male	119	Nos.
DN 20 : 3/4" Male	3	Nos.
<b><u>Flexible Pipe Clip</u></b>		
20MM	192	Nos.
25MM	9	Nos.



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<b>DESCRIPTION</b>		
( To be specified by the supplier, if any variation)		
<b>Description</b>	<b>Qty.</b>	<b>Unit</b>
<b>Valve</b>		
Ball Valve (SS) Female - 1"	4	Nos.
Ball Valve (SS) Female - 1/2"	67	Nos.
Supply, Installation of 12mmx1/2" PU connector	142	Nos.
PU tube(8MM X ID 5MM -100M) for FRL connection to the ball valve	1	No.
MS fitting & Hardware	800	KG
Installation Testing & Commissioning	1	Lot

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### ANNEXURE - V : ELECTRICAL DETAILS

DESCRIPTION		
( To be specified by the supplier, if any variation)		
Standard Operating Frequency	:	50 Hz
Standard Operating Voltage	:	230 /415 V 3 Phase *
Total power consumption	:	*
Motor Details with rpm	:	*
Gear Box Details (If any)	:	*
PLC and HMI details	:	*
Control panel details	:	*
VFD details (If any)	:	*
Tower lamp details (If any)	:	*
Starter	:	*
<b>Major Cabling details</b>		
For Main supply (In client's scope)	:	
For Main drive motor	:	*
End connection details	:	MCB or Socket should be with equipment
Earthing requirement	:	Arrangement should be considered with system
An Isolator Circuit breaker	:	To be supplied with machine at power supply in point of appropriate capacity by vendor. *
Cable length with equipment	:	*
<i>Any other detail not mentioned above, also to be included.</i>		
<i>Client will provide &amp; connect the required cable in to vendor's panel. From machine panel to machine and its other accessories to be supplied and connected by vendor at site.</i>		

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### ANNEXURE - VI : SAFETY FEATURES

DESCRIPTION
(To be specified by the supplier, if any variation)
Safety of machine operation is of utmost importance.
All guards to be with interlock switches. *
Equipment to be provided with overload safety relay. *
In the event of malfunction or stoppage of utilities, the unit must contain all necessary protection devices to ensure that equipment and product remain in safe condition. *
Equipment settings should not get disturbed due to power failure and should not Re-start without human intervention. *
Equipment should indicate fault through audio / visual signal with details on Control panel/PLC (Failure mode detection). *
An easily accessible emergency stops to be provided on main control panel door. *
Wherever possible, warning symbols should be provided. *

\* To be specified and confirm by the supplier as per their equipment design and requirement



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### ANNEXURE - VII : UTILITY REQUIREMENT

DESCRIPTION		
(To be specified by the supplier, if any variation)		
Vacuum	:	*
Any other	:	*

**Note: All necessary utility filters with housing and accessories to be provided by vendor.**

\* To be specified and confirm by the supplier as per their equipment design and requirement



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## ANNEXURE - VIII : CLEANING TECHNIQUE

DESCRIPTION		
( To be specified by the supplier, if any variation)		
Mode of machine cleaning	:	*
Use of Lubricants	:	*
All contact parts should be easily dismantled and cleanable.		
Easy washing and cleaning facility should be available.		

\* To be specified and confirm by the supplier as per their equipment design and requirement



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### ANNEXURE - IX : PHYSICAL DETAILS

<b>DESCRIPTION</b>		
(To be specified by the supplier, if any variation)		
Dimension (In mm)	:	*
Net Weight (In Kgs.)	:	*
Type of Packing	:	*
Case Dimension (In mm)	:	*
Gross Weight (In Kgs.)	:	*
Foundation details if required	:	*

\* To be specified and confirm by the supplier as per their equipment design and requirement



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### ANNEXURE - X : LIST OF ANCILLARY / ACCESSORIES / OPTIONAL ITEMS

#### DESCRIPTION

( To be specified by the supplier, if any variation)

- Optional Items (If any , Vendor should provide the list with rate) \*
- Recommended Spares along with list & quantity (Vendors should submit with tender) \*
- If any items required but not included in URS , to be mentioned and submitted with unit rate and quantity \* (And it can be indicate during pre-bid meeting)

Details of Bought out components to be specified.

Any other ancillary or accessories or optional items not mentioned above also to be quoted.

**SP. NOTE :** Provision should be given in the system for the installation of 1 more air drier in future without affecting air supply to the production area.

\* To be specified and confirm by the supplier as per their equipment design and requirement



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### **ANNEXURE - XI : TRAINING REQUIREMENT**

- Training to all concern of M/s. HOMCO, Kerala for Installation, Operation, Maintenance and Cleaning of Rotary Screw Air Compressor (Oil-free) shall be provided by vendor and training record will be documented.
- Vendor shall support client in execution of all the Qualification Phases.



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### ANNEXURE - XII : DOCUMENTATION

List of all Documents to be supplied along with equipment [AS APPLICABLE]			
Sr. No.	Document to be supplied	Qty	Remarks
1	Design and operational qualification	2 sets	
2	FAT Reports	2 sets	
3	Operation manual	2 sets	
4	Maintenance manual	2 sets	
5	Spare parts manual	2 sets	
6	All engineering drawings	2 sets	
7	Calibration certificates	2 sets	
8	Warranty / Guarantee	2 sets	
9	List of all components with referencing	2 sets	
10	Civil foundation drawings	2 sets	
11	Pre installation requirements	2 sets	
12	Installation requirements	2 sets	
13	Installation manual	2 sets	
14	Technical literature, data sheets and equipment catalogues	2 sets	
15	Calibration Report of all sensors, controllers, PLC, transmitters, indicators etc.	2 sets	
16	DQ, IQ, PQ documents.	2 sets	





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### ANNEXURE - XIII : TERMS AND CONDITIONS

Delivery Period	:	*
Payment Terms	:	As mentioned in tender.
Packaging and Forwarding	:	<b>By Vendor</b>
Un-loading at site	:	By vendor /Supplier (If required, help for the arrangements of unloading can be done by client) Installation in position by the vendor under the client's <b>supervision</b>
Excise / Taxes /GST	:	*
Material for Trial arrangement	:	* (To be arranged by client)
Installation and Commissioning	:	<b>By Vendor</b>
<b>Submission of documents and drawings</b>		
Response to URS and submission of quotation	:	Within 1 week
Submission of detail functional design specification and schematic drawings	:	Within a week after order finalization
Submission of FAT / SAT specification	:	2 weeks before FAT
Submission of DQ, IQ, OQ, PQ documents	:	With equipment delivery
Final drawings / diagrams	:	Within 8 day of receiving PO
The supplier should notify customer 2 weeks in advance of the beginning of FAT.		
Catalogue, Equipment drawing, List of clients and year of establishment to be submitted along with quotation.		
<i>Any other terms, not mentioned above, also to be specified.</i>		

\* To be specified and confirm by the supplier as per their equipment design and requirement



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### ANNEXURE - XIV : ABBREVIATION

1.	URS	:	User Requirement Specification.
2.	HOMCO	:	Kerala State Homeopathic Co-operative Pharmacy Ltd.
3.	DQ	:	Design Qualification
4.	IQ	:	Installation Qualification
5.	OQ	:	Operational Qualification
6.	PQ	:	Performance Qualification
7.	SS	:	Stainless Steel
8.	RHS	:	Right Hand Side
9.	MOC	:	Material of Construction
10.	KW	:	Kilo Watt
11.	HP	:	Horse Power
12.	RPM	:	Rotation Per Minute
13.	FLP	:	Flame Proof
14.	cGMP	:	Current Goods Manufacturing Practices
15.	P& ID	:	Piping and instrumentation diagram
16.	O&M	:	Operation and Maintenance
17.	GA	:	General Arrangement
18.	SLD	:	Single Line Diagram
19.	HOD	:	Head of Department
20.	QA	:	Quality Analysis
21.	MRP	:	Maximum Retail Price
22.	NMT	:	Not more than
23.	VFD	:	Variable frequency drive
24.	FAT	:	Factory Acceptance Test
25.	SAT	:	Site Acceptance Test

**Any other details, not mentioned in Annexure I to XIII, to be specified in the quotation/specification by the vendor.**