User Requirement Specifications
Mobile CIP system

Process Code	Area	Equipment code	Qty. (Nos.)	Capacity
P	Pertussis	P- CIP 01 and P-CIP 02	2	-
F	Formulation	F-CIP 01 and F-CIP 02	2	-

URS Annexure List

URS Annex No.	Detail
1	P&ID as separate URS annexure
2	List of preferred MAKE of components

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1.0 APPROVAL SIGNATURE

This document is prepared by the Validation and GMP compliance team of "NNE Pharmaplan India for the project "Revival of DPT Vaccine Manufacturing Facility" (project number:-110831) of Pasteur Institute of India, Coonoor under the authority of their Project Manager. Hence, this document before being effective shall be approved by the QA team and authorized by the appropriate Project Authority.

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2.0 EQUIPMENT DESCRIPTION

The equipment described by this URS is Mobile CIP system.

Mobile CIP system is used for cleaning solution preparation, recirculation and cleaning of the process equipment/vessel. The scope of the Mobile CIP system which includes the preparation of cleaning solution, transfer the CIP solution with the required flow rate & velocity, Re-circulating the CIP solution to the vessel and draining of the CIP solution at the end of the sequence.

Design, function and control of the unit should be cGMP compliant. The Equipment should be designed considering easy accessibility and maintenance. All piping should be designed to achieve 100% drainability as per the guidelines of ASME BPE 2012.

The Skid mounted Mobile CIP system with integrated pump, Lockable castor wheels, Heat exchanger, Process vessel, HMI, valves, instrumentation and control panel with following features:

S No.	Description	Remarks
A.	**The vessel should be equipped with the following requirements:** Sterile vent filter should be provided for venting and pressurizing the vessel. The filter should be of sterilization grade filter cartridge with code 7 type. The filter housing should be constructed of 316L stainless steel with necessary assembly.	
B.	Air Pressure regulator should be provided in the air line for regulating the air pressure.	
C.	Spray ball should be provided in the top dish of the vessel for PW/WFI supply.	
D.	Dosing bottles with necessary accessories like level switch, Non-Return valve, metering/ stroke pumps should be provided for acid & alkali solutions.	
E.	Differential pressure sensor (Hydrostatic Type) should be provided for measurement and control of liquid level in the vessel.	
F.	Port for recirculation line should be provided on the top dish. The recirculation line should be provided with Suitable heat exchanger for heating CIP solution, centrifugal pump for recirculation and transfer of CIP solution.	
G.	Two numbers of metering pumps for addition of acid and alkali, all necessary automation and instrumentation should be provided for fully automatic functionality of the system.	
H.	Centrifugal pump with Suitable flow rate should be provided for re circulation and transfer of the CIP solution, all necessary automation and instrumentation should be provided for functionality of the system. Pump should be provided with a drain line.	
I.	A flow switch should be provided to prevent the centrifugal pump from dry running.	
J.	Conductivity sensor (0.04to 500 mS/cm) should be provided on the recirculation line and drain line for the measurement and control during CIP solution preparation & CIP cycle.	
K.	Temperature sensor duplex Pt 100 should be provided on the discharge line of the centrifugal pump for the measurement and control of CIP solution temperature during heating.	
L.	All the condensate drain lines should be provided with necessary steam traps.	

The equipment should consist of following parts for operation:

TABLE 1

S. No.	Description	Purpose	MOC	Remarks
1	Shell	Cylindrical	SS316L	
2	Top closure	Tori spherical dish	SS316L	
3	Bottom closure	Tori spherical dish	SS316L	
4	Insulation	To avoid heat loss	Mineral wool	
5	Cladding	Outer cover to Insulation	SS304	
6	Heat exchanger [Shell & Tube]	Maintain the CIP solution temperature	SS 316L	

TABLE 2

S. No.	Description	Pertussis (P)	Formulation (F)	Remarks
1	Equipment code	P-CIP 01 and 02	F-CIP 01 and 02	
2	No. of system	2	2	
3	Geometric Volume	VTS	VTS	
4	Min Operating Volume	VTS	VTS	
5	Acid dosage container	VTS	VTS	
6	Alkali dosage container	VTS	VTS	
7	H/D	VTS	VTS	

TABLE 3

Nozzle schedule:	**Remarks**
Top Dish:	
Light and sight port	
Port for Spray ball	
Spare port –TC end	
Acid addition port	
Alkali addition port	
Port for vent filter	
Bottom dish:	
Transfer line port/vessel outlet port	

Level Indicator	

TABLE 4

System ID	Max Working Volume of System (WV) L	Subjected Vessel	Capacity (GV) L	Quantity nos.	Recirculation Pump flow rate m3/hr
P-CIP 01	200 L	Seed Fermentor	25 L	1	VTS
		Fermentor	500 L	2	
		Sterile Filtration system (Grade B area)	-	1	
P-CIP 02	250 L	Blending Vessel	750 L	1	VTS
F-CIP 01	200 L	Buffer Preparation Vessel	250 L	1	VTS
		Component mixing Vessel	150 L	1	
		Component mixing Vessel	150 L	1	
		Mixing Vessel	500 L	1	
		Mixing Vessel	500 L	1	
		Saline Mixing Vessel	250 L	1	
		Saline Mixing Vessel	250 L	1	
		Homogeniser	150 L	1	
		Gel Sterilisation	100 L	1	
F-CIP 02	250 L	Blending Vessel	750 L	1	VTS

Note:

I.	This Technical Specification is the basis for an inquiry to a vendor and therefore the basis for the vendor's proposal.
II.	The vendor is asked to state in "REMARKS" column with "yes" if the described requirement will be completely fulfilled and with "no" in case the requirement will not or cannot be fulfilled with the proposed equipment. In case of any deviation a comment must be inserted or enclosed as a separate annexure by referring to the respective URS specification number.
III.	The vendor must clearly comment on each item of the Technical Specification. The comments must be in English language. If extra cost for necessary options becomes necessary the item must be clearly stated.
IV.	In case that the requirement includes a question or request or information from the vendor, the answer / information should be stated in the "REMARKS" column.
V.	The final version of this document including the vendor's comments will become basis of a potential purchase order or contract.
VI.	The Technical Specification serves to define a summary of all vendor's requirements concerning scope of delivery and services.
VII.	The vendor is responsible for technically unobjectionable function of the equipment. This TS is not intended to dictate a technical design to the vendor. If agreed upon with the vendor, the vendor can apply his practically proven design.
VIII.	Special Instruction a. If no comments against any specification, shall be considered as "NO" and b. If there is no reply / comments against the complete URS by the vendor then it shall be treated as unresponsive / technically non-compliant and rejected.
IX.	All the instruments and controls mentioned in the URS(s) are expected to be standard supply and part of your standard equipment model. In case of any deviation or redundancy or additional scope of supply is noticed, vendor is required to obtain clarification from HLL before submitting the quotes.
X.	The makes requested are standard international makes. In case of any deviation, vendor to seek clarification from HLL before submitting the offers.
XI.	Refer document Installation Requirement Specification and Specific Instructions with URS; NPI_110831_IRS_PIIC_01
XII.	Refer Tender document with URS; NPI/110831/EQP/TD/07

Specifications	Remarks
3.0 PROCESS DESCRIPTION	
3.1 Input & Charging Method	
The alkali and acid solutions are prepared in Mobile CIP system with the help of metering pump and transferred to the equipment for cleaning. Cleaning solution can be charged continuously to the CIP tank so that tank should be provided with 'HIGH' and 'LOW' level functions to control the addition and discharge from the tank.	
3.2 Brief Process Steps	
Mobile CIP system will perform all the sequence i.e., Preparation, Transfer, Recirculation etc. from the system itself by taking the I/O from victim Vessel PLC. The system should be capable of the following sequence of cleaning cycle: 1) <u>Wash Phases:</u> Once through with PW rinse- 55-60°C 2) <u>Alkali addition through metering/dosing pump:</u> PW addition through set point flow meter Re-circulation with Alkali solution- 55-60 °C 3) <u>Intermediate wash:</u> Once-through with PW 4) <u>Acid addition through metering /Dosing pump</u>: PW addition through set point flow meter Re-circulation with Acid solution Once-through with PW 4) <u>Rinse Phases:</u> Recirculation/Once-through with WFI 5) <u>Drying in place</u>: Air blow to the equipment	
3.3 Output & Discharging method	
The prepared CIP solution will be transferred to the process vessel which will be recirculated with the help of Mobile CIP system	
After achieving required conductivity the solution will be drained.	
4.0 PRODUCTIVITY REQUIREMENT	
4.1 Desired/ suggested capacity	
See Table 4	

Specifications	Remarks
4.2 Standard batch size	
Not Applicable	
4.3 Change Over Time	
Not applicable	
4.4 Other Productivity Requirement	
Not applicable	
5.0 CONTAINMENT	
Not Applicable	
6.0 GMP REQUIREMENTS	
6.1 Process control	
The equipment must operate and control the following process cycle:	
6.1.1 Duration of each cycle.	
6.1.2 Number of cycles.	
6.1.3 Quantities of wash liquid in each cycle.	
6.1.4 Temperature of washing liquid.	
6.1.5 Cycle sequence	
6.1.6 Conductivity	
6.1.7 pH(0-14)	
6.2 Failure mode detection	
6.2.1 Equipment should be capable to detect the following failure, notify the operator with alarm and shutdown the process:	
a) Emergency stop activated	
b) Power	
6.2.2 Following condition need only notification to operator for procedural control	
a) End of any/all process sequence.	
b) Low compressed air	

Specifications	Remarks
6.3 In –Process Control	
Not Applicable	
6.4 Level of instrumentation	

Sufficient and suitable instrumentation for the process, safety and productivity control as indicated in the following table:

Type of control	Purpose	Instrumentation
Temperature	To monitor , control and record the temperature	Temperature sensor and transmitter
DP Sensor (Hydrostatic Type)	To monitor , control and record the level in Vessel	DP sensor and transmitter
pH & Conductivity	To monitor , control and record the Conductivity	pH and Conductivity sensor and transmitter
Flow	To check flow	Flow switch
Level Indicator	To monitor, control and record the level	Level sensor and transmitter
Speed	To control the speed of Pump	VFD

6.5 Batch data display and record printing		
6.5.1	The system should be provided with all necessary automation and instrumentation for establishing interface (Handshake b/w the system) with other systems.	
6.5.2	Controller: - PLC Based Controller (Non-editable data format to be obtainable) with minimum of 10” size HMI (Displaying data trends as Graphs, synoptic view of running parameters etc.)	
6.5.3	**The HMI should be of touch screen type (Provision for manual operation to be provided).** All settings should be user adjustable. HMI and Control Panel should be mounted on skid. • Human machine interface must be used to enter the process details, which should appear in the print out. • All critical alarms, Critical parameters and interlocks • All Recipes/ sequences • P&ID of the vessel along with instrumentation details • Login details • HMI screen showing simulation of valves	
6.6 GMP requirements (Others)		
6.6.1	All valve and joints should be sanitary type (preferably tri-clover connection).	
6.6.2	Equipment should be completely drainable.	

	Specifications	Remarks
6.7	Specific requirements	
6.7.1	All attachments required for fixing nozzles, supply pipes and return pipes should be provided by vendor only	
6.7.2	All the operations should be automatic through PLC, HMI and provision to be provided for manual interventions.	
6.7.3	All the flexible piping used for cleaning services should be of SS re-enforced and PTFE lined to withstand pressure, temperature and very high and low pH.	
6.7.4	Vendor should provide the following details in the quotes apart from these mentioned in the URS (a) Makes of pumps (Supply and return), Conductivity meter, Valves, PLC etc. (b) Schematics of the Mobile CIP system Vessel Capacity	
6.7.5	The Vendor should ensure maintenance parts availability for a minimum of 15 months from delivery.	
6.7.6	Cables, air tubes, etc required from the point (single utility point) to equipment is in scope of vendor.	
6.7.7	Vendor to perform a criticality assessment to assess the applicability of the system to Part 11 regulation. Software, if used to generate, process, store the quality critical data must be validated and must comply 21 CFR Part 11 requirements	
6.7.8	Vendor should provide the FRL (Filter, regulator, lubricator), automatic valve assembly and air pressure switch for instrument air. Connections to automatic diaphragm valve should be in vendor scope.	
7.0	**CONSTRAINTS**	
7.1	Equipment location and available space	
	NA	
7.2	Available utility	
7.2.1	Plant steam – 130 °C – 150°C at 3 – 3.5 bar (g) ----------(Report requirement)	
7.2.2	WFI (Hot loop) – 80-85°C at 2 bar (g) ----------(Report requirement)	
7.2.3	Purified Water- 28 – 30°C at 2.5 bar (g) ----------(Report requirement)	
7.2.4	Electricity – Vendor to specify----------(Report requirement)	

7.2.5 Compressed air- 6.0– 8.0 bar (g) ----------(Report requirement)	

Note: Utility consumption to be specified by the vendor, in case if there is a deviation in the values mentioned above.

8.0 ABBREVIATION

List of abbreviations

Abbreviation	Definition
µS/cm	Micro Siemens per centimeter
CFR	Code of Federal Regulation
NPI	NNE Pharmaplan India
PIIC	Pasture Institute of India, Coonoor
QA	Quality Assurance
SS	Stainless steel
URS	Users requirement specification
WHO	World Health Organization

9.0 REVISION INDEX

Revision	Date	Reason for revision
00	2014-10-17	First Draft for Client's Review

URS Annexure 2: List of Preferred Make of components

SL.NO	DESCRIPTION	MAKE
A	**INSTRUMENTATION**	
1	PLC	Allen Bradley/ Siemens
2	Operator Interface/HMI	Allen Bradley/ Siemens
3	Temperature transmitter	Radix/ Yokogawa/Emerson
4	Temperature sensor	Negele/ Radix/Negale
5	Conductivity sensor	Metler Toledo/E+H
6	DP transmitter	E+H/Negele
7	DP sensor	E+H/Rosemount /Emerson
8	Flow switch	Negele/ Danfoss/E+H
9	VFD	Allen Bradley/ Siemens /Danfoss
B	**MECHANICAL**	
10	Centrifugal pump	Alfa Laval/ Grundfos
11	Vent filter cartridge	Sartorius/Pall/ Millipore
12	Spray ball	Hake/Lechler/Alfa laval
13	Diaphragm valve(Manual)	GEMU/Burkert/ITT/SED/saunders
14	Ball valve(Manual)	Modentic/Saunders/Alfa laval
15	Flexible hose	AB Synthetic/ AMI Polymer / Venair
16	Dosing metering pump	Prominent/ Masterflex
17	Steam trap	Steriflow/spirax marshall
C	**PNEUMATIC**	
18	Diaphragm valve(Automatic)	GEMU/Burkert/ITT/SED/saunders
19	Angle seat valve(Automatic)	GEMU/Burkert/ITT/SED/saunders