PHARMA DEVILS

PRODUCTION DEPARTMENT

STANDARD OPERATING PROCEDURE	
Department: Production	**SOP No.:**
Title: Operation & Calibration of Liquid Particle Counter	**Effective Date:**
Supersedes: Nil	**Review Date:**
Issue Date:	**Page No.:**

1.0 OBJECTIVE:

To lay down a procedure for the Operation and Calibration of Liquid particle counter.

2.0 SCOPE:

This SOP is applicable for Operation and Calibration of Liquid particle counter **Make**: HIAC **Model No**.9703+, **Instrument ID-…….**in Quality Control Laboratory……...

3.0 RESPONSIBILITY:

Officer/Executive-QC

4.0 ACCOUNTABILITY:

Head – QC

5.0 DEFINITION:

Liquid particle counting is used to measure the size and distribution of particles in a liquid or on solid samples. The particle distribution and size are measured by irradiating a liquid sample with a laser diode and detecting the scattered light. The properties of the scattered light are related to the particle size.

6.0 PROCEDURE:

6.1 Operation of Liquid Particle Counter:

6.1.1 Clean the LPC Instrument, Computer System (UPS & Monitor) with the help of dry lint free cloth.

6.1.2 Ensure the cleaning of LPC Instrument & Computer System before switch ON.

6.1.3 Switch ON the LPC Instrument pressing key located at the front side of the instrument.

6.1.4 Switch ON the CPU and monitor.

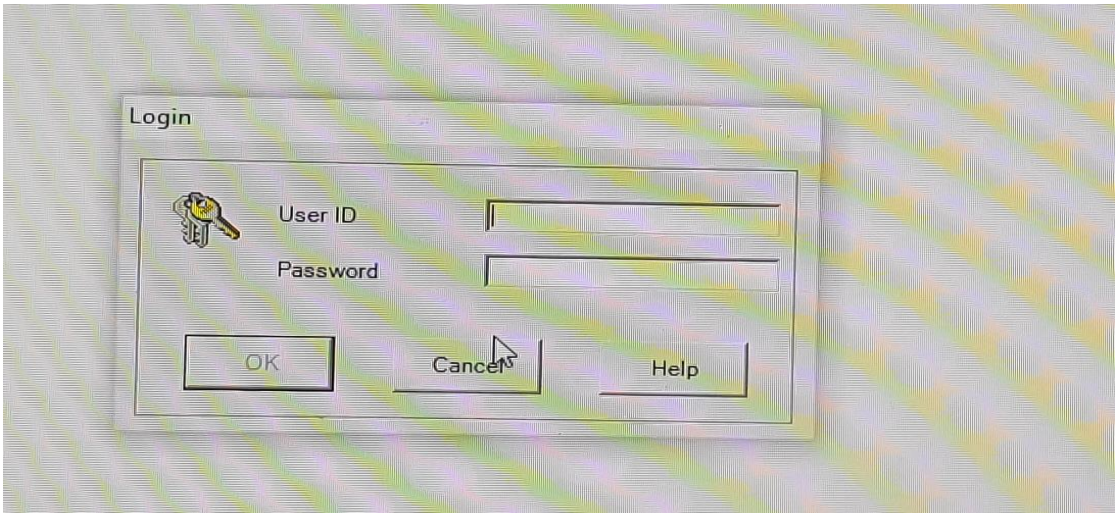
6.1.5 Every user's window username and password shall be defined.

6.1.6 Open the window as per defined user for operation.

6.1.7 Select the "PharmSpec" Software icon on the desktop.

6.1.8 Double click "PharmSpec" Software and Software shall be open as per below.

6.1.9 Open the HIAC "PharmSpec Version 3" Software and below window shall be open.



6.1.10 Fill the "PharmSpec" software User ID and password in next column.

Click OK to open the "PharmSpec" software and open the "PharmSpec" "Main" window.

LPC "PharmSpec" Software is open and ready for analysis.

6.2 Procedure for Analysis on Liquid Particle Counter :

6.2.1 Select the "Standard Procedures" and Select the desired test to be performed

6.2.2 For performing Environment test, dip the Instrument sensor in Particle free water & rinse the Syringe with same.

6.2.3 Select the Standard Procedures as per required sample volume and test defined in Pharmacopeias or standard test procedure.

6.2.4 For performing the Environment Test follow as per below windows.

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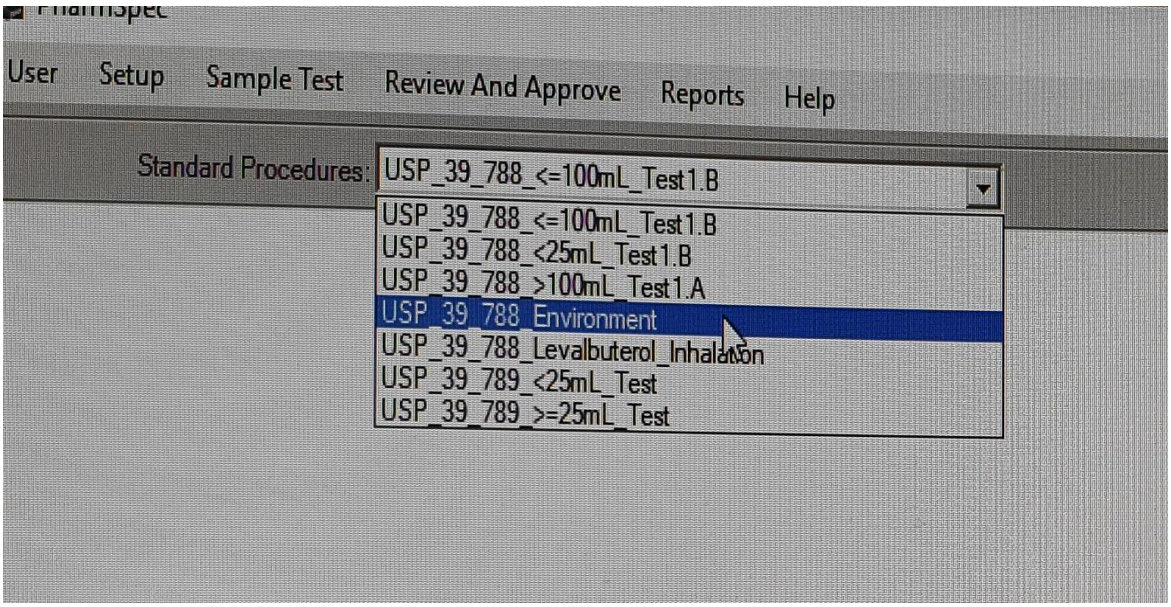
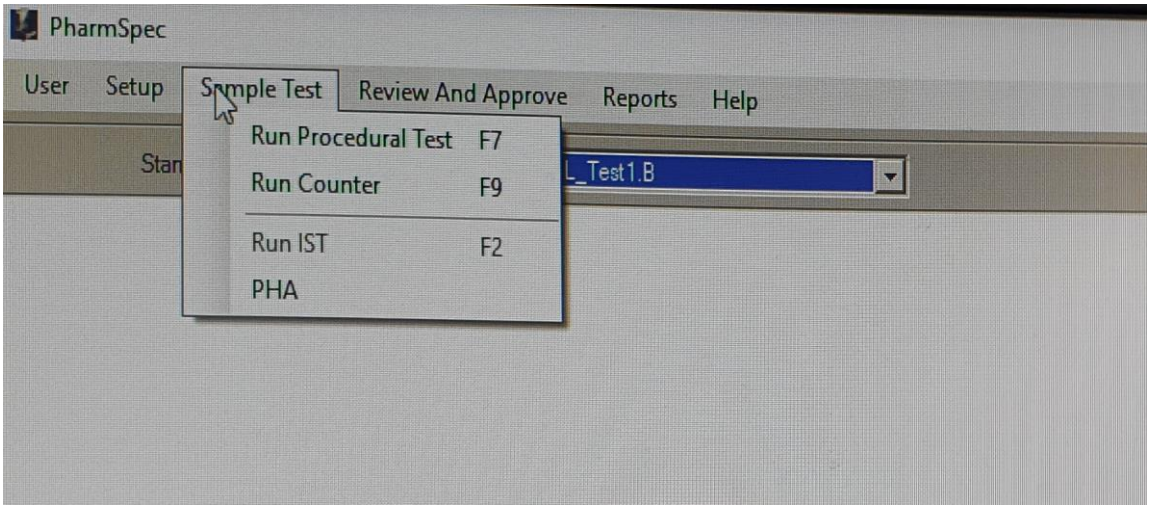


6.2.5 After that put the mouse on “Sample Test” icon on “PharmSpec” main window

6.2.6 Click to Run Procedural Test, as per blow Windows.



6.2.7 The Sampler Identification window shall open

6.2.8 Enter the sample identification value (s) for the sample to be used, Fill the Comment 1 and Comment 2.

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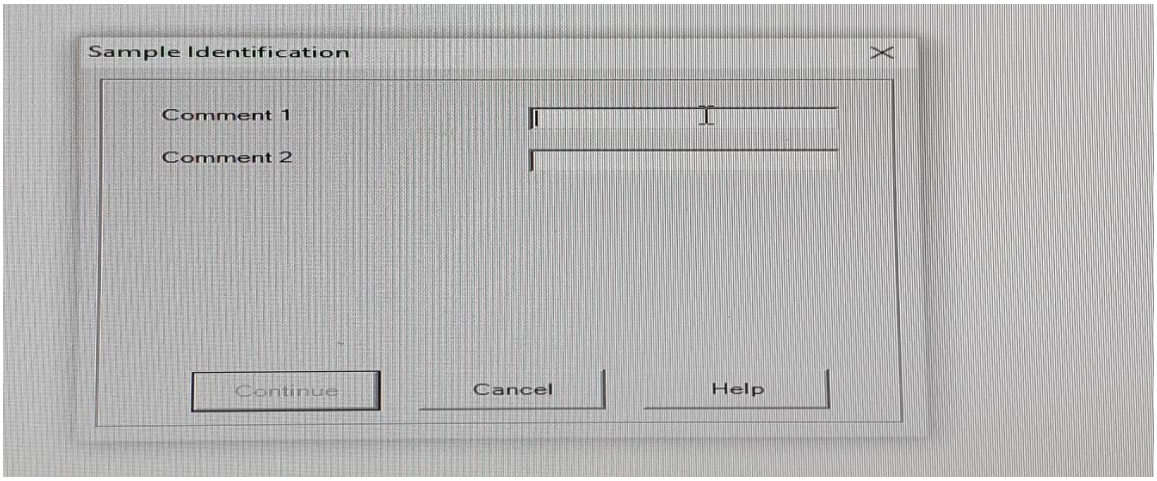
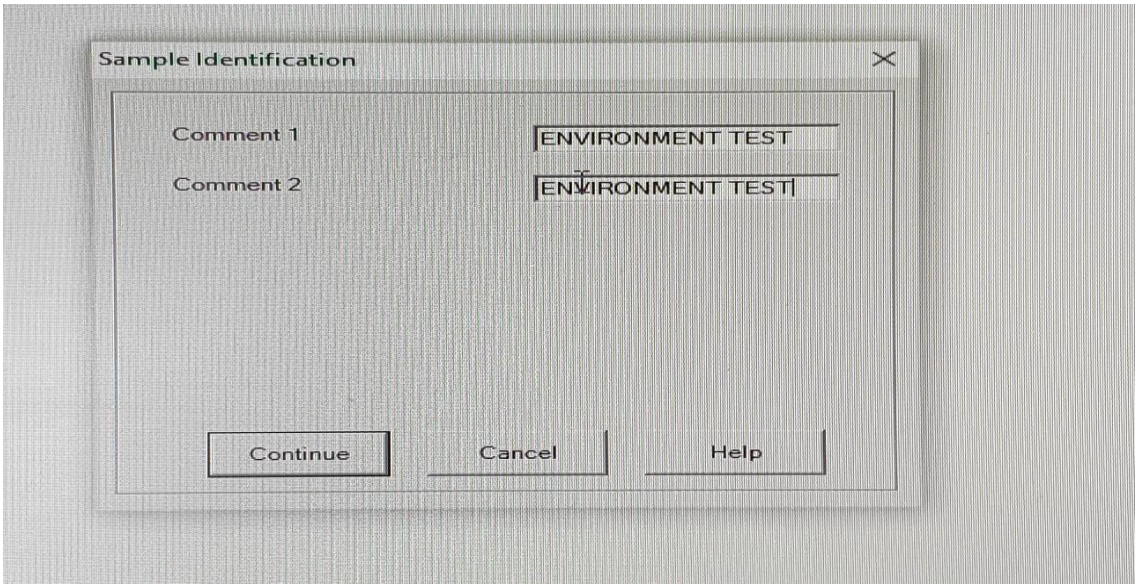


6.2.9 Fill Sample Name or Batch Number in Comment 1 and 2 and Click to Continue.



6.2.10 Do the steps in the Description field.

6.2.11 Change the test parameters as necessary, each parameter field shows as default value. The parameters can be changed within the limits set in the procedural test

6.2.12 Click Start.

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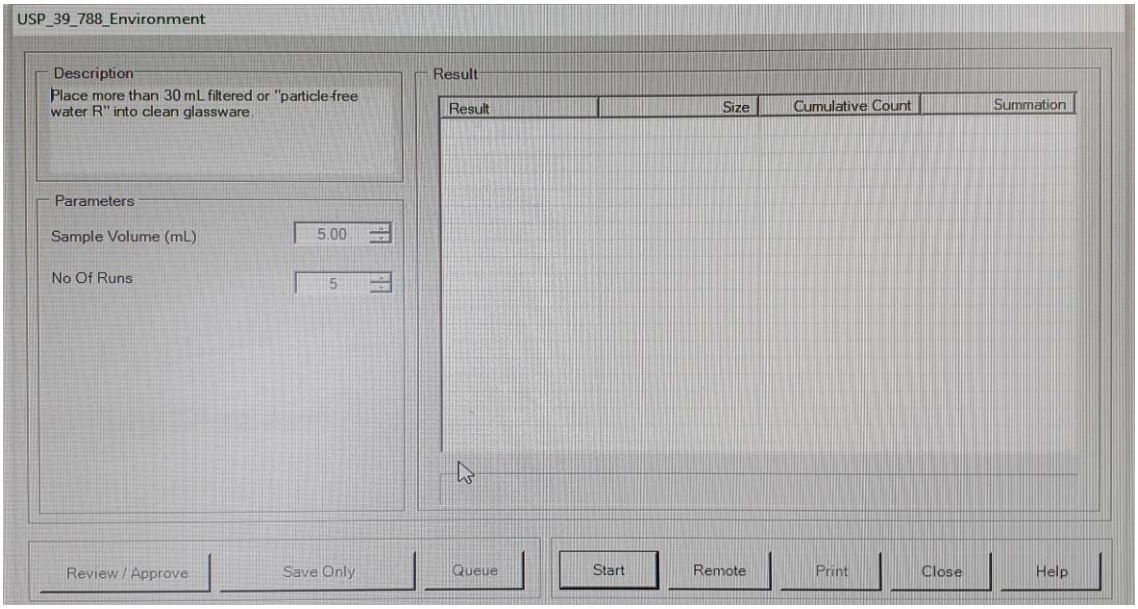

6.2.13 The test results are show in the Results are of the window. The test outcome (PASS or FAIL) is shown at the bottom of the results area of the window when test runs are done.

6.2.14 Operator check the result status (PASS or FAIL), print the report

6.2.15 "Queue" for electronic Review/ Approval of reports.

6.2.16 Click to "Queue" report automatically save in "Review And Approve" for electronic signature.

6.2.17 Close the window.

6.2.18 After completion of analysis Select "Review And Approve"

6.2.19 The electronic review and/or approve test results in the "Queue"

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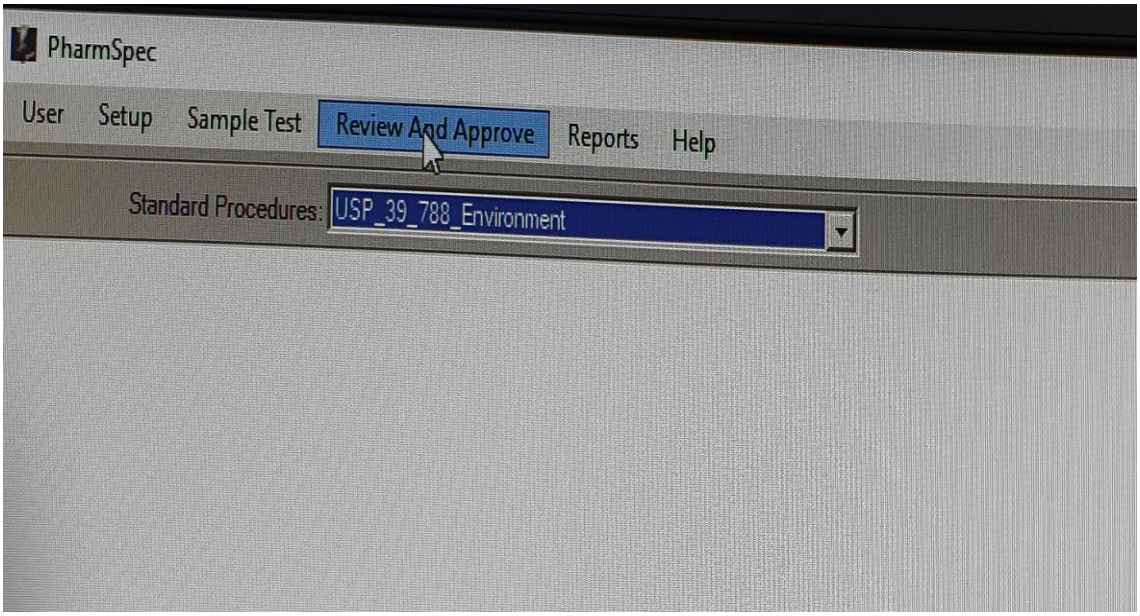

6.2.20 Test results that have not been approved are shown in the "Select Test Result field"

6.2.21 Expand the test procedures (click+) to show the test results for the procedure that have not been approved.

6.2.22 To add a review to the test results selected.

6.2.23 QC Reviewer/or Section In charge/designee shall review the report.

Enter comments and click "Review"

Enter the Windows user name and password of a "PharSpec" user with the Review Reports right on the computer

6.2.24 Click "OK"

6.2.25 The comments and electronic signature of the reviewer are added to the report in Review details with Review date and time

6.2.26 To add another review to the test results selected.

6.2.27 Click "Close" to close the windows.

6.2.28 Select "Review and Approve" to open the windows for Report Approve.

6.2.29 QC Manager/or designee shall Approve the reports.

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6.2.30 Select the test Result to Approve.

6.2.31 Enter comments in bottom side "Enter comments"

Click "Approve"

6.2.32 Enter the Windows user name and password of a "PharSpec" user with the Reports Approve, right on the computer.

6.2.33 Click "OK"

6.2.34 Click Close to close the window.

6.2.35 Select "Reports" option , Historical Reports window opens.

6.2.36 Select the search criteria for the test report (s) to be viewed, exported and/or printed.

6.2.37 Select an end date for the date range in the Ending date field, which you want to see.

6.2.38 Select Sample ID.

6.2.39 To add a user name to the search filter, select a user name in the Operator field.

6.2.40 Click "Apply".

6.2.41 The test reports that meets the search criteria is shown. The date/time information and the name of the user that did are shown.

6.2.42 To view a test report, select the report and click "View" or double-click the report.

6.2.43 To print one test report, select the report and click "Print"

To print more than one test report, select the checkbox for each report to print, Click Print

6.2.44 To save one or more than one test report to computer or a network drive , select the checkbox for each report to export. Click "Export"

6.2.45 After take out the Print Close the Report.

6.2.46 After Analysis, Exit from Software as per below Procedure.

6.2.47 Click "User" icon and select "Exit" and finally select "OK"

6.2.48 Below Windows shall open.

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6.3 ENVIRONMENT TEST:

6.3.1 Environment Test shall be carried out one time in a day before each sample analysis for system suitability check.

6.3.2 Follow procedure for Environment test with respect to point No. 6.2.

6.3.3 In order to check the Environment test suitable for the analysis, the glassware must be properly cleaned.

6.3.4 Water to be used must be particle-free Water.

6.3.5 To check Particulate contamination of 5 samples of particle-free water, each of 5 mL, shall be used according to the method described in Point No. 6.2.

6.3.6 Acceptance criteria : Not more than 25 particles of 10µm (or large) per 25 ml,

6.3.7 The preparatory steps must be repeated until the environment, glassware and water are suitable for the test.

6.3.8 Analysis cannot be performed without passing the Environmental test.

6.3.9 If Environmental test does not complies repeat the test taken more precautions.

6.4 SAMPLE ANALYSIS

6.4.1 Mix the contents of the sample by slowly inverting the container 20 times successively, if necessary, cautiously remove the sealing closure.

6.4.2 Clean the outer surfaces of the container opening using a jet of particle and remove the closure, avoiding any contamination of the contents.

6.4.3 Eliminate gas bubbles by appropriate measures such as allowing to stand for 2 min or sonicating.

6.4.4 For large-volume parenterals, single units are tested.

6.4.5 For small-volume parenterals less than 25 mL in volume.

6.4.6 The contents of 10 or more units are combined in a cleaned container to obtain a volume of not less than 25 mL; where justified and authorised, the test solution shall be prepared by mixing the contents of a suitable number of vials and dilute to 25 mL with particle-free water or with an appropriate solvent without contamination of particles when particle-free water is

not suitable.

6.4.7 Small-volume parenterals having a volume of 25 mL or more shall be tested individually.

6.4.8 Powders for parenteral administration are reconstituted with particle-free water or with an appropriate solvent without contamination of particles when particle-free water is not suitable.

6.4.9 Remove 4 portions, each of not less than 5 mL, and count the number of particles equal to or greater than 10 µm and 25 µm.

6.4.10 Disregard the result obtained for the first portion, and calculate the mean number of particles for the preparation to be examined.

6.4.11 Evaluation

6.4.11.1 For preparations supplied in containers with a nominal volume of more than 100 mL, apply the criteria of Test 1.A

6.4.11.2 For preparations supplied in containers with a nominal volume of less than 100 mL, apply the criteria of Test 1.B

6.4.11.3 For preparations supplied in containers with a nominal volume of 100 ml, apply the criteria of Test 1.B

6.4.11.4 Acceptance Criteria : As per STP or Pharmacopoeial monograph

6.5 CALIBRATION PROCEDURE :

6.5.1 Calibration shall be performed by authorized agency once in a year. Calibration Frequency Yearly ± 15 days Refer SOP for operation/usage, calibration and maintenance of laboratory instruments and equipments.

6.5.2 Before Calibration Check the Cleaning, Temperature and performed the Environment test.

6.5.3 Fill the Calibration record in Annexure No.- I

6.5.4 Below mention parameters shall be performed during calibration of instrument.

6.5.5 Sample volume Accuracy

6.5.5.1 Fill Purified water in Beaker and weigh the beaker Analytical Balance.

6.5.5.2 Replace the Beaker in LPC Instrument Sensor and Set the Sample Volume and Run

Number.

6.5.5.3 Start the Run as per set Volume.

6.5.5.4 After completion of the run, weigh the beaker.

6.5.5.5 **Acceptance Limit :** ±5.0 % of Set Injection volume.

6.5.6 Sample Flow Rate

6.5.6.1 Fill Purified water in Beaker.

6.5.6.2 Set Target Flow rate (ml/Min)

6.5.6.3 Set Sample Volume (ml) and Number of Runs.

6.5.6.4 Start the Flow rate.

6.5.6.5 Check the First Measured Time and Second Measured Time in Second.

6.5.6.6 Check the Observed Flow Rate (mL/Min) Average.

6.5.6.7 **Acceptance Limit :** NMT ± 10% from set flow rate

6.5.7 Moving Window Test :

6.5.7.1 The apparatus is calibrated using suitable certified reference materials consisting of dispersions of spherical particles of known sizes between 10 µm and 25 µm.

6.5.7.2 Moving window test with 10, 15 & 25 µ particle size standards Certified Standard.

6.5.7.3 Set the Sample Volume 10 ml and Run each standard.

6.5.7.4 Check the Particle Size of 10, 15 & 25 µ particle size standards.

6.5.7.5 Check the Expected MV and Difference with standard particle size in percentage.

6.5.7.6 **Acceptance Limit :** NMT ± 10% from set Particle Size.

6.5.8 Sensor Resolution Test :

6.5.8.1 Sensor Resolution test perform with 10 µ particle size standard.

6.5.8.2 Set Sample Volume 10 ml and Run Number.

6.5.8.3 Start the Resolution test.

6.5.8.4 After analysis check the Mean Particle size, Coefficient of Variance, Standard Deviation and CV.

6.5.8.5 Acceptance Limit : NMT ± 10% from set Particle Size

6.5.9 Particle Counting Accuracy Ratio

6.5.9.1 For Particle Counting Accuracy test used 10 µ,15 µ particle size standards particle size certified standard.

6.5.9.2 Run 1 shall be discarded.

6.5.9.3 Run blank in triplicate and check the 10 µ, 15 µ particle size in blank.

6.5.9.4 Set No of Runs (Step2 and Step3) 3 runs

6.5.9.5 Set Sample Volume (Step2 and Step3) 5 ml

6.5.9.6 Start the test and check the Ratio of Counts.

6.5.9.7 Acceptance Limit : Between 1.5 to 3.5

6.5.10 General Precaution :

6.5.10.1 After analysis Store the LPC Sensor with 70 % v/v Isopropyl Alcohol.

6.5.10.2 Do not hold the LPC Sensor in Air.

6.5.10.3 Before and after analysis clean the LPC Instrument with lint free clothes.

6.5.10.4 Before analysis rinse the syringe with diluents three times.

6.5.10.5 Analysis cannot be performed without passing the Environmental test

6.5.10.6 Always calibrated LPC Instrument take for analysis.

6.5.10.7 During Environment test or sample analysis cover the sample with Aluminum foil.

6.5.10.8 Take more precaution to minimize the contamination.

6.5.10.9 Used suitable glassware for LPC analysis is Properly cleaned and free from any particles.

6.5.10.10 Only Authorized User Access the LPC Instrument.

6.5.10.11 Operate the Instrument below 25 C^{o} temperature.

6.5.10.12 Switch off the LPC Instrument after analysis.

6.5.10.13 Record shall be maintained for Instrument usage log book as per Annexure-I format.

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7.0 ABBREVIATIONS:

SOP	Standard Operating Procedure
LPC	Liquid Particle Counter
WFI	Water for Injection
No.	Number
Ltd.	Limited
QA	Quality Assurance
QC	Quality Control
ID	Identification
NMT	Not More Than
µm	Micron
µ	Micro

8.0 ANNEXURES:

ANNEXURE No.	TITLE OF ANNEXURE	FORMAT No.
Annexure – I	Liquid Particle Counter Calibration Record	

9.0 DISTRIBUTION:

Controlled Copy	Quality Control
Master Copy	Quality Assurance

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10.0 REFERENCES:

Instruction Manual & USP/ BP /In-house

11.0 REVISION HISTORY:

Revision No.	Change Control	Details of Changes	Reason of Changes	Effective Date	Done By
00	Not Applicable	Not Applicable	New SOP		

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ANNEXURE – I

LIQUID PARTICLE COUNTER CALIBRATION RECORD

Instrument Name: **Frequency of Calibration :**
Instrument ID : **Date of Calibration :**
Make & Model : **Next due date for Calibration:**

CALIBRATION SUMMARY

Hygrometer ID. No:…….…….....

S.No.	Check Parameter	Observation	Limit
1.	Cleanliness of the Instrument		Should be Clean
2.	Temperature of the area where the Instrument is located		Less than 25 Cº
3.	Environment test		Not more than 25 particles of 10µm (or large) per 25 ml

Result: Passes / Fails

Calibrated By: Checked By:
Date: Date:

SAMPLE VOLUME ACCURACY

Sample Preparation: Purified water

S.No.	Sample Volume (ml)	Initial Weight (g)	Weight After Tare (g)	Weight After Sample (g)	Measured Volume (ml)	Limit ± 5.0% of set Injection vol.

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Analytical Balance ID : _____

Result: Passes / Fails
Calibrated By: Checked By:
Date: Date:

SAMPLE FLOW RATE

Sample Preparation: Purified water

S.No.	Target Flow rate (ml/Min)	Sample Volume (ml)	First Measured Time(Sec.)	Second Measured Time (Sec.)	Run 1	Run 2	Average	Limit: NMT ±10% from Set flow rate

Result: Passes / Fails
Calibrated By: Checked By:
Date: Date:

MOVING WINDOW TEST

Particle size standards :_____
Standard Lot Number 10 µm :_____ , Use before date :_____
Standard Lot Number 15 µm :_____ , Use before date :_____
Standard Lot Number 25 µm :_____ , Use before date :_____

S. No.	Standard Particle Size	Sample Volume (ml)	Observed MV	Expected MV	Difference	Observe Particle Size(µm)	Limit: NMT ±10% from Set Particle Size
1.	10 µm						9.00 µm to 11.00 µm
2.	15 µm						13.50 µm to 16.50 µm
3.	25 µm						22.50 µm to 27.50 µm

Result: Passes/Fails
Calibrated By: Checked By:
Date: Date:

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SENSOR RESOLUTION TEST

Particle size standards :_____

Standard Lot Number 10 µm :_____ , Use before date :_____

S. No.	Standard Particle Size	Sample Volume (ml)	Observed SD	Observed CV	Observe Particle Size (µm)	Limit: NMT ±10% from Set Particle Size
1	10 µm					

Result: Passes / Fails

Calibrated By: Checked By:
Date: Date:

PARTICLE COUNTING ACCURACY RATIO

Particle size standards :_____

Standard Lot Number 10 µm :_____ , Use before date :_____

Standard Lot Number 15 µm :_____ , Use before date :_____

Run 1 is discarded: _____

Sample Volume (Step2 and Step 3) (ml): _____
No. of run (Step2 and Step 3: _____

Particle Size (µm)	Particle Size in Blank (Average)	Particle Size in Standard (Average)	Result Counts /mL	Ratio of counts	Limit:
10					Between

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15					**1.5 to 3.5**

Result: Passes / Fails

Calibrated By: Checked By:

Date: Date:

Remark: The instrument complies / does not comply with calibration parameters and can be/ cannot be use for routine analysis.

Calibrated By: Checked By:

Date: Date: