



STANDARD OPERATING PROCEDURE

Title: Operation and Cleaning of Integrity Tester Machine (Palltronic Flowstar IV)

SOP No.:		Department:	Production
		Effective Date:	
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1.0 OBJECTIVE:

To lay down a Procedure for Operation and Cleaning of Integrity Tester (Palltronic Flowstar IV).

2.0 SCOPE:

This SOP is applicable for the Operation and Cleaning of Integrity Tester used for checking integrity of Filters Cartridges or Capsules (Hydrophobic, Hydrophilic) in production department.

3.0 RESPONSIBILITY:

Officer / Executive – Production

4.0 ACCOUNTABILITY:

Head – Production

5.0 ABBREVIATIONS:

BPT	Bubble Point test
FFT	Forward Flow test
FRL	Filter Regulator & Lubricator
IPA	Iso Propyl Alcohol
Ltd.	Limited
Pvt.	Private
QA	Quality Assurance
SOP	Standard Operating Procedure
WFI	Water for Injection
WIT	Water Intrusion Test
PDA	Parenteral Drug Association
QMS	Quality Management System

6.0 PROCEDURE:

6.1 PRECAUTIONS :

6.1.1 Before Integrity testing, filter shall be properly wet with ambient temperature WFI.
(In case of Hydrophilic filters)

6.1.2 Filters shall be wet with 70% v/v IPA v/v with ambient temperature WFI.
(In case of hydrophobic filters)

(Note: After filter Integrity, Filters shall be sterilized before installation).

6.1.3 Don't touch the screen of integrity tester with any hard material, use pointer pen.



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- 6.1.4 Filter integrity shall be performed along with original housing to be used for filtration process.
- 6.1.5 Check supply air pressure (5000-6000 mbar) before start the test.
- 6.1.6 Check and ensure the all tube fittings, clamp gasket etc., should be properly assembled and leak proof.
- 6.1.7 Never open the filter housing during the operation.
- 6.1.8 Filter must be completely wetted with respective liquids before start the test.
- 6.1.9 Check & insure FRL should be working condition which is installed in Air Line to remove any moisture.
- 6.1.10 Check and ensure that respective test parameters are selected for the respective filters.
- 6.1.11 Operation and handling of the machine shall be done only trained and competent staff person.
- 6.1.12 In case of Post Integrity failure of Hydrophobic and Hydrophilic Filters refer **Annexure-III** for the action plan.
- 6.1.13 In case filter integrity machine shows error during the operation, refer **Annexure-IV**.

6.2 BUBBLE POINT TEST OF CARTRIDGE OR CAPSULE FILTER:

- 6.2.1 Prior to conduct bubble point test of the filters, it should be assembled in respective housing or lines.
- 6.2.2 Attach the inlet of filter housing or capsule filter inlet with "Air Outlet" of Integrity Tester by cleaned tubes.
- 6.2.3 Connect a piece of flexible tubing from the downstream port of the filter and another end of the flexible tube open in a container filled with water.
- 6.2.4 Attach the compressed air line to the "Air Outlet" of Integrity Tester (Air Supply pressure 5000-6000 mBar).
- 6.2.5 Switch "ON" the Instrument starting screen shall display as below:



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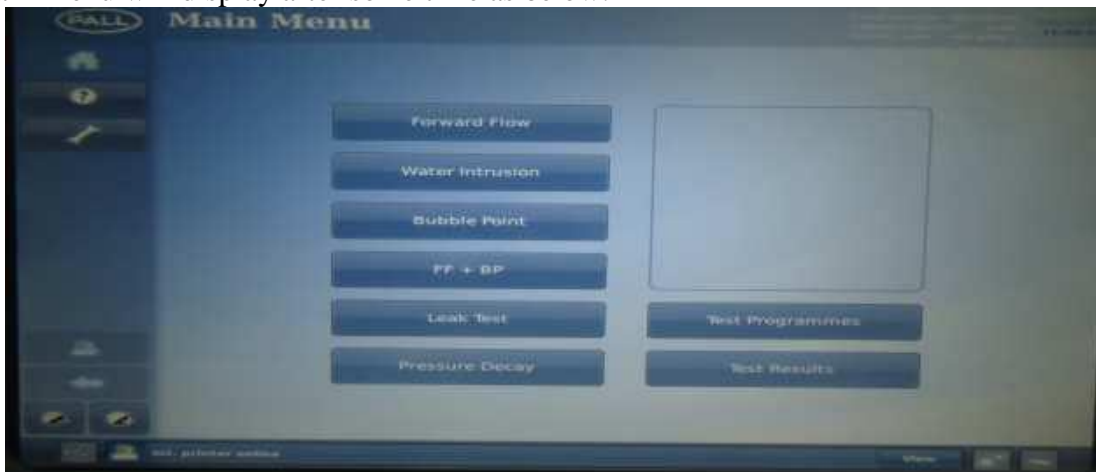
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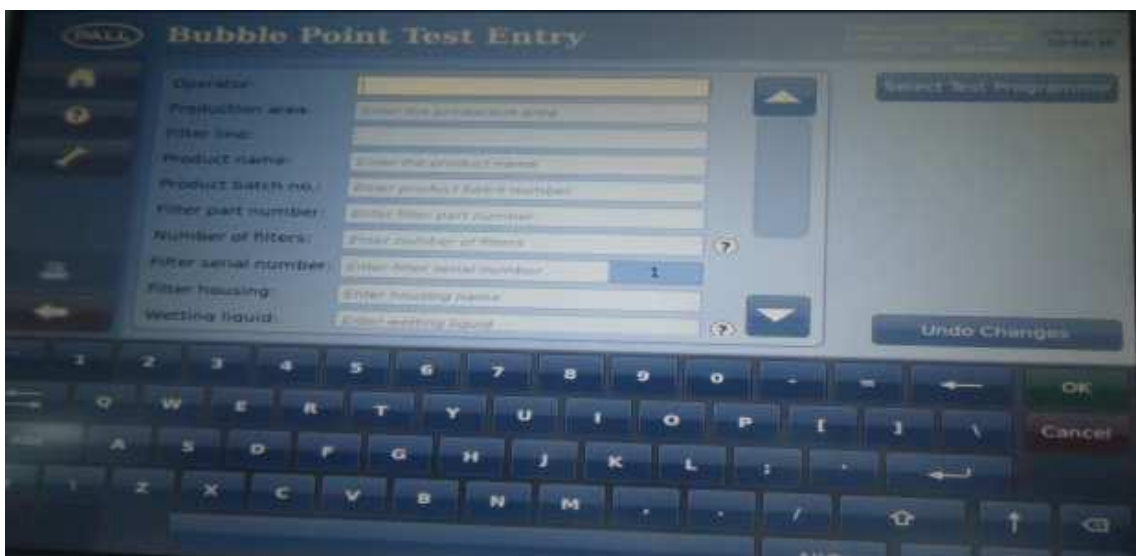


6.2.6 Press the button at back side of instrument to open the upper flap of the integrity tester.

6.2.7 Main Menu will display after some time as below.



6.2.8 Select or Click on type of test perform and press the icon (Bubble Point) to start the integrity test of filters, the screen of tester will show as below:





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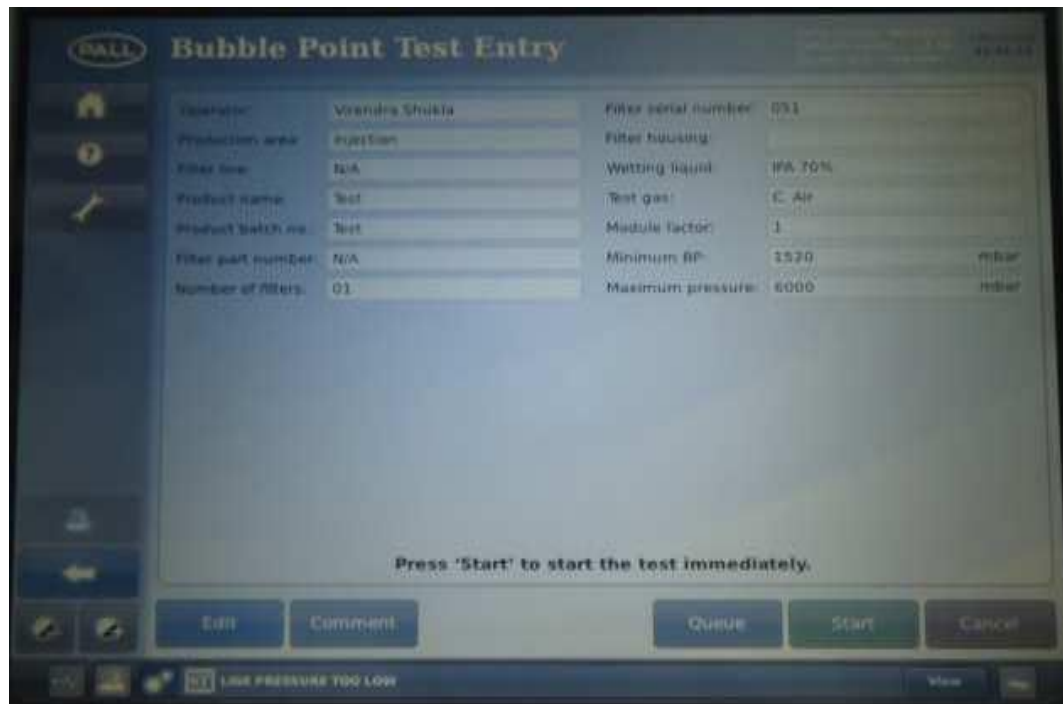
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6.2.9 Select and fill the all detail about the respective filters (Manufacturer Certificate Detail). Eg.

Operator	XXX
Production Area
Filter line	Nitrogen/ Compressed Air
Product name	XXX
Product batch no.	XXX
Filter part no.
Number of filters	01
Filter serial no.
Filter housing	Capsule/ Cartridge
Wetting liquid	WFI
Test gas	Air
Module factor	1
Minimum BP	3200 mbar
Maximum pressure	5500 mbar

Note: If Maximum pressure value not given in respective literature, Add 1000 mbar in Minimum BP value.

6.2.10 Click/Press on the “OK” to continue the operational process.



6.2.11 Check the filled detail/ parameters if it is ok then press the “START” icon to start the process.



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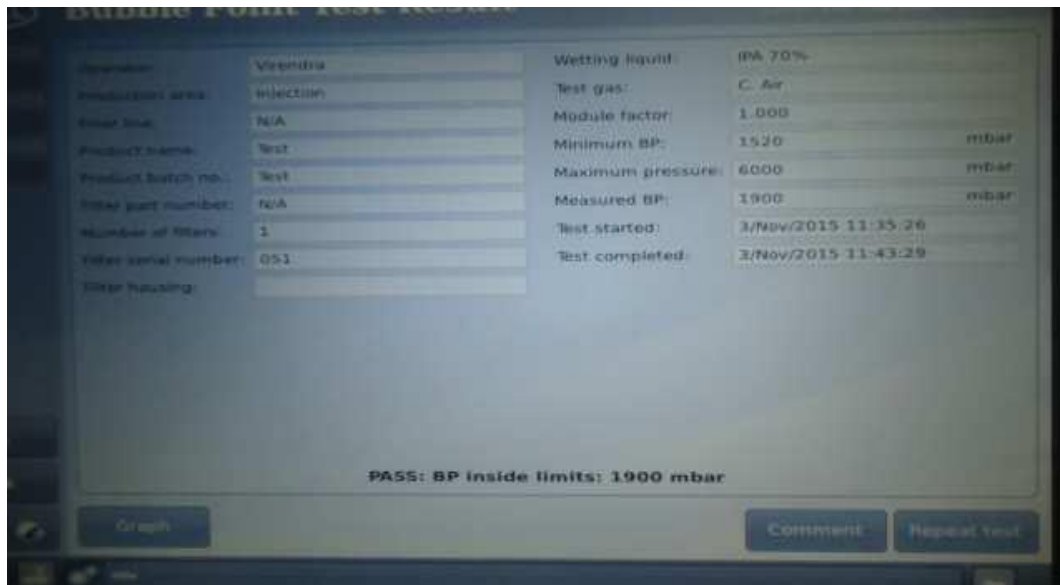
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6.2.12 After pressurize the filter, screen will show as:



6.2.13 After completion of the test Bubble point value shall display on the screen and report shall auto saved in the system.



6.2.14 Click on the “Graph” to see the graph of the pressure raise during “Bubble Point Test”



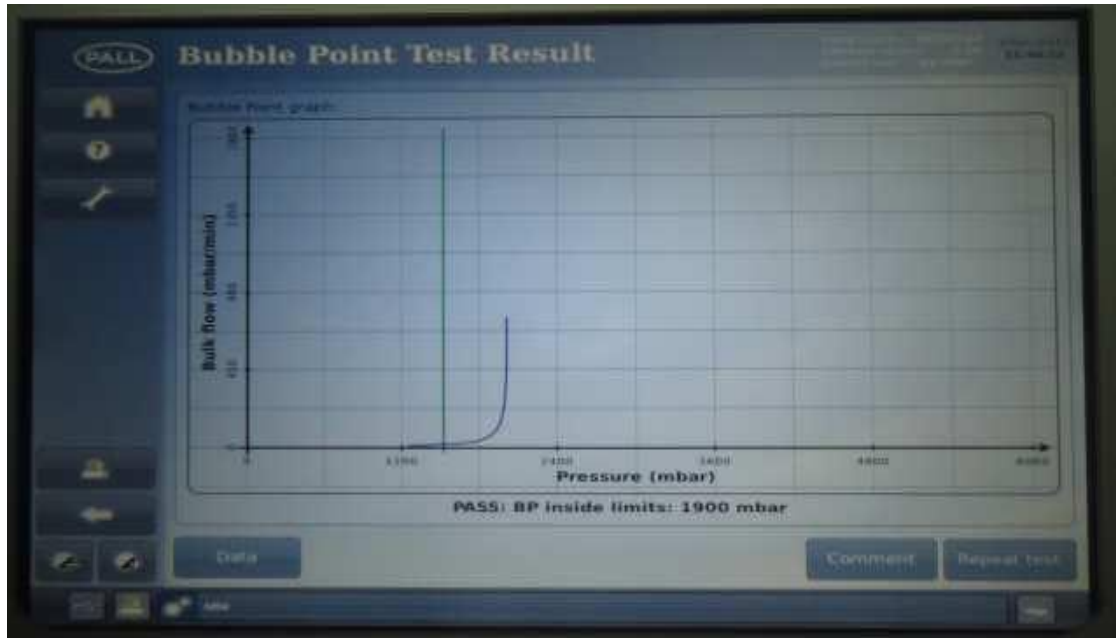
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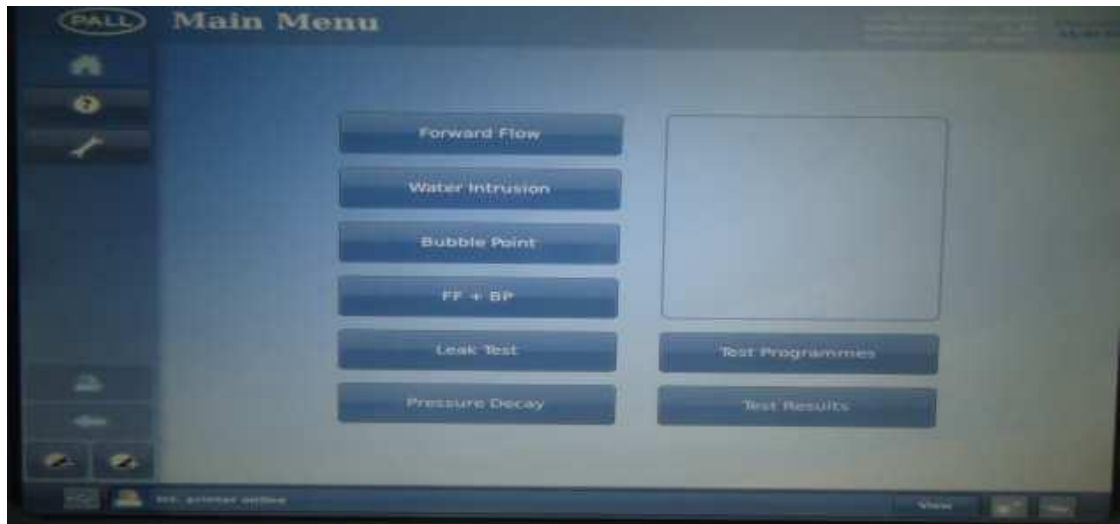
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6.2.15 Click on the Icon  to print the test report.


6.2.16 Click on “Home” Icon on the screen for “Main Menu” and the screen will show as:



6.2.17 To view the previously saved report click on the “Test Results”.

6.2.18 All the saved report shall display on the screen.

6.2.19 Select the report to print the saved test report.

6.2.20 Click on the Icon  to view the report, test report shall display on the screen.

6.2.21 Click on the Icon  to print the test report.

6.3 INTERPRETATION OF RESULT:



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6.3.1 If the values measured by the equipment for the individual test is within limits as mention in its “Manufacturer Quality Certificate”, it indicates that the filter is “OK”.

6.3.2 If “NOT OK” Follow the **Annexure-III (Action Plan in case of Integrity failure of Hydrophobic and Hydrophilic Filters)** and repeat the filter integrity test. If filter not complies second time initiate the incident as per current version of SOP.

6.3.3 Install a new filter after check its integrity. Refer **Annexure-I** of SOP on “**Issuance, Usage, Replacement and Integrity Testing of Filters**” for test result interpretation. Location of hydrophobic filter to be show in **Annexure –II**.

6.4 CLEANING PROCEDURE:

6.4.1 Switch “OFF” the main supply of Integrity Tester.

6.4.2 Disassemble all tube lines of the Integrity Tester.

6.4.3 Clean the external body of Integrity Tester with the help of cleaned lint free duster soaked with 70 % IPA.

6.4.4 Dip the tubes in 70 % IPA for 10 min, after that rinse with WFI and dry it by flushing of compressed air.

6.5 DURING THE BREAKDOWN OF THE FILTER INTEGRITY MACHINE:

6.5.1 In case of Filter Integrity Machine breakdown, we can do Pre and Post Integrity of filters (Hydrophobic/Hydrophilic) Filter Integrity Machines without any activity stopped.

6.5.2 Break down intimation slip shall be given to engineering department for the same.

6.5.3 Deviation/Incident shall be raise in the QMS regarding the Filter Integrity Machine.

6.5.4 Remarks shall be entered in the logbook for the Deviation/Incident No.

6.5.5 Integrity details shall be entered in the log book of respective blocks, where the Filter Integrity performed.

6.5.6 Yearly servicing shall be done at the time of yearly calibration of the filter integrity machine.

6.5.7 All filters integrity stored data shall be transferred from integrity testing machine via pen drive with help of IT and engineering department and transferred data shall be stored at production PC, at every 3 month for further track record or investigation purpose if needed.



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7.0 ANNEXURES:

ANNEXURE No.	TITLE OF ANNEXURE	FORMAT No.
Annexure – I	Operation and Cleaning Record of Integrity Tester	
Annexure – II	Location of Hydrophobic and Hydrophilic Filters	
Annexure –III	Action plan in case of Integrity failure of Hydrophobic and Hydrophilic Filters.	
Annexure–IV	Error Messages during Operation of Filter Integrity Machine.	
Annexure–V	Filter Integrity Machine, Servicing and Calibration Record.	

ENCLOSERS: SOP Training Record.

8.0 DISTRIBUTION:

- Controlled Copy No. 01 Quality Assurance
- Controlled Copy No. 02 Production
- Master Copy Quality Assurance

9.0 REFERENCES:

PDA Technical Report No.26

10.0 REVISION HISTORY:

CHANGE HISTORY LOG

Revision No.	Change Control No.	Details of Changes	Reason for Change	Effective Date	Updated By



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ANNEXURE-II LOCATION OF HYDROPHOBIC AND HYDROPHILIC FILTERS

Filter Type: Hydrophilic

Block:

S.No.	Location of filter	Pore size, Nos., Filter Size (inch)	Filter shape
1.	On BFS machine (Filling Room)	0.2 (μ) , 2Nos , 10"	Cartridge
2.	Mfg. to Holding (Filtration Room)	0.2 (μ) , 1Nos (10"/20"/30")	Cartridge

Filter Type: Hydrophobic

3	Compress Airline filter mfg.01	0.2 (μ), 1Nos, 5"	Cartridge
4	Compress airline filter filtration 01	0.2 (μ), 1Nos, 5"	Cartridge
5	Manufacturing line N ₂ Filter	0.2 (μ), 1Nos, 5"	Cartridge
6	Holding N ₂ Filter	0.2 (μ), 1Nos, 5"	Cartridge
7	Machine air Filter	0.2 (μ), 1Nos, 5"	Cartridge
8	Machine Balloon Filter	0.2 (μ), 1Nos, 5"	Cartridge
9	Machine blow Filter	0.2 (μ), 1Nos, 5"	Cartridge
10	Machine buffer Filter	0.2 (μ), 1Nos, 5"	Cartridge
11	Disinfectant Air Filter	0.2 (μ), 1Nos, 5"	Cartridge
12	Machine Airline Filter	0.2 (μ), 1Nos, 5"	Cartridge
13	Machine N ₂ Filter	0.2 (μ), 1Nos, 5"	Cartridge
14	Super-Heated Air filter	0.2 (μ), 1Nos, 20"	Cartridge
15	HPHV autoclave (Vent Filter)	0.2 (μ), 1Nos, 5"	Capsule
16	Mixing tank 1 KL (Vent Filter)	0.2 (μ), 1Nos, 5"	Cartridge
17	Mixing tank 4 KL (Vent Filter)	0.2 (μ), 1Nos, 10"	Cartridge
18	Holding tank 1 KL (Vent Filter)	0.2 (μ), 1Nos, 5"	Cartridge
19	Holding tank 4KL (Vent Filter)	0.2 (μ), 1Nos, 10"	Cartridge



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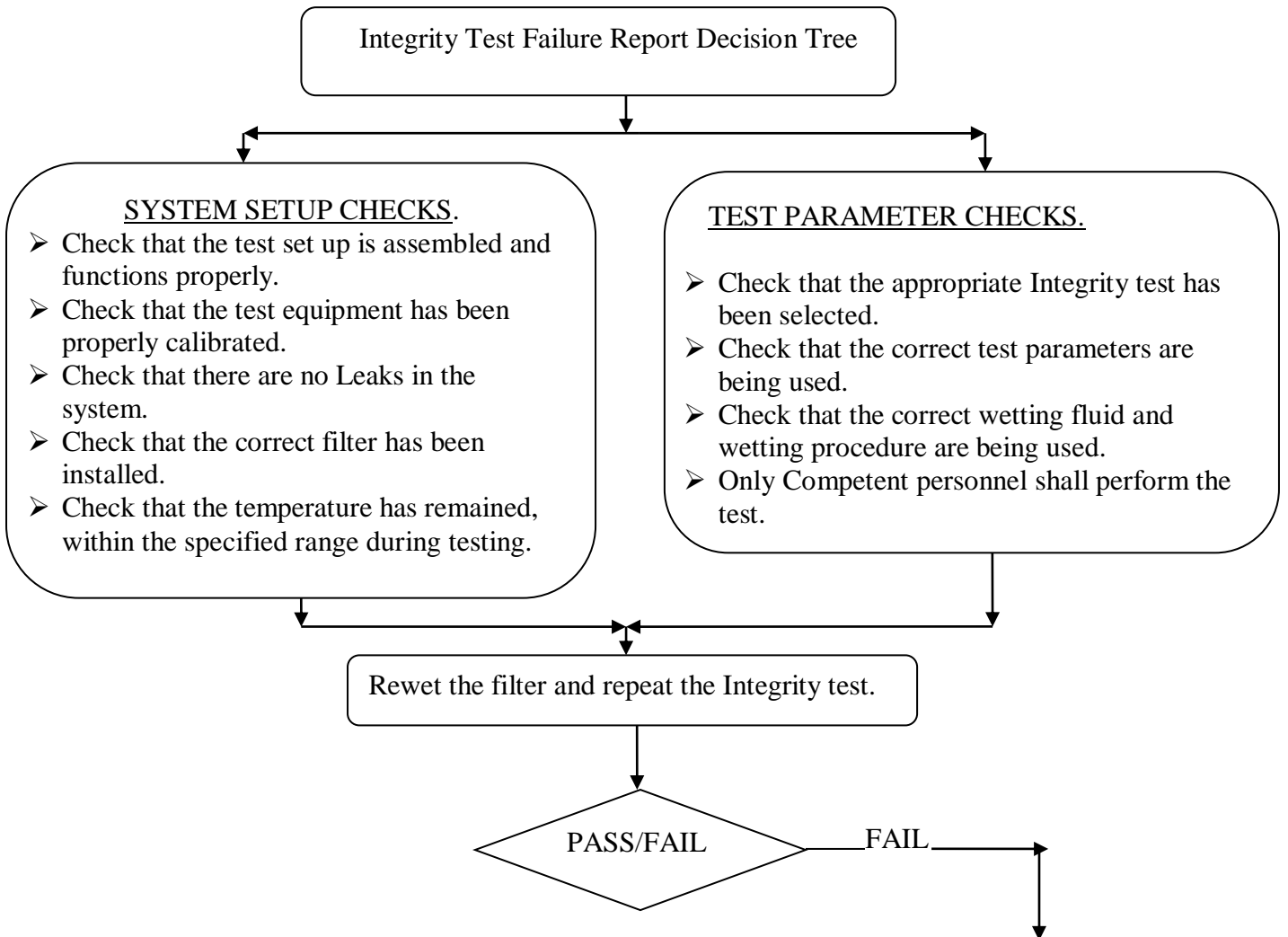
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ANNEXURE-III

ACTION PLAN IN CASE OF INTEGRITY FAILURE OF HYDROPHOBIC AND HYDROPHILIC FILTERS

Integrity Test Failure Report Decision Tree





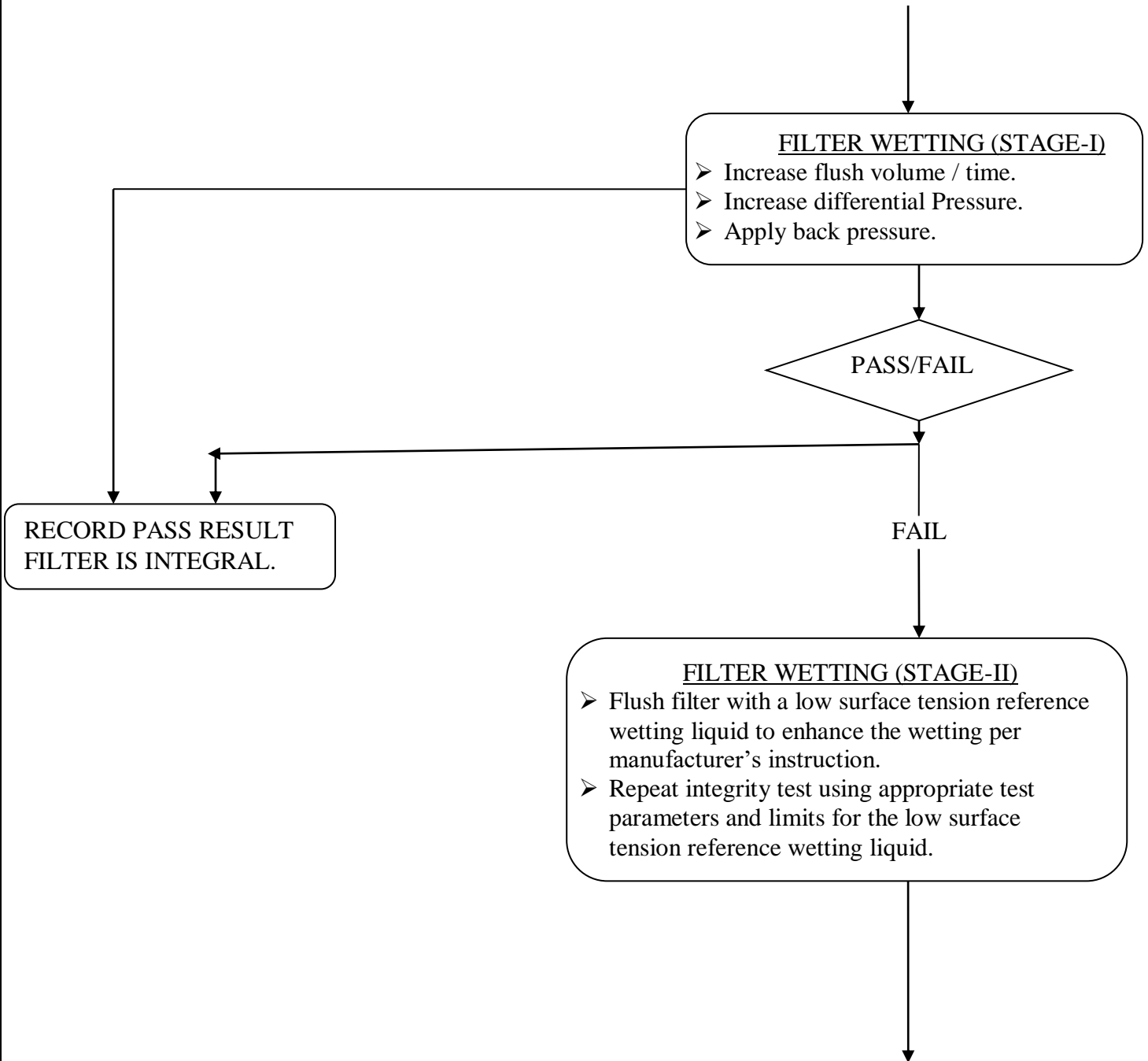
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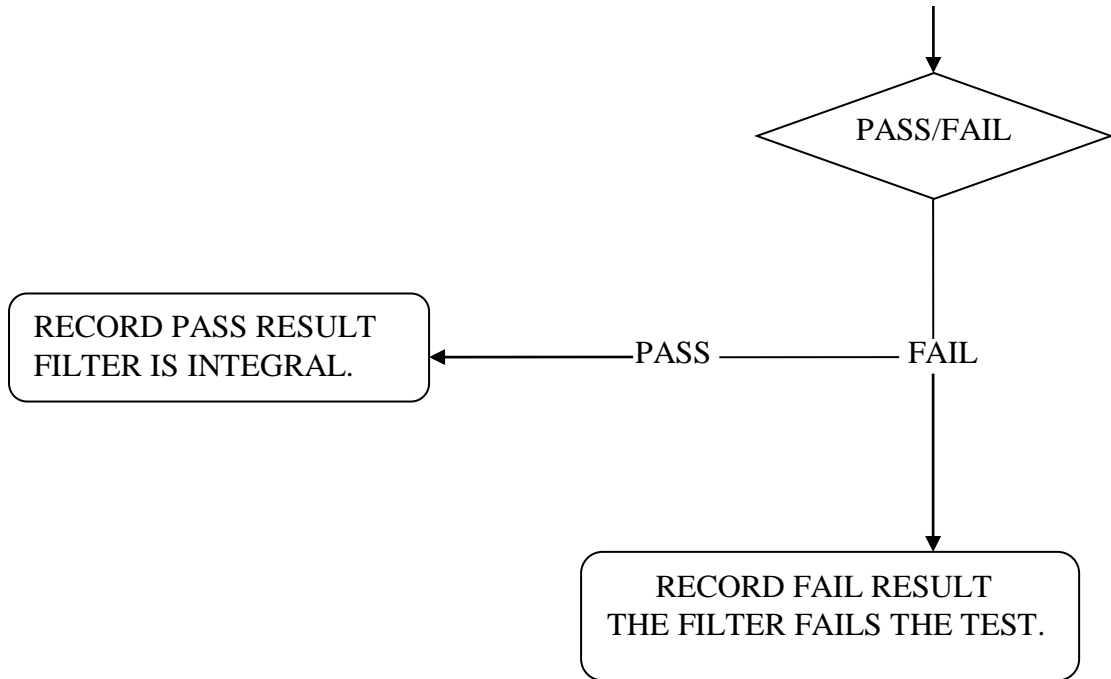
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- Note:**
1. Failure interpretation shall be recorded in respective log book and related printout shall be Attached in respective documents.
 2. Deviation/Incident shall be taken on the basis of outcome of investigation and Risk Assessment.
 3. All the electronic data shall be verify by QA at the time of log sheet submission and Retrieval, also remarks and counter sign shall be done by QA.



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ANNEXURE-IV

ERROR MESSAGES DURING OPERATION OF FILTER INTEGRITY MACHINE

❖ The Table below enumerates most common error messages and their possible causes. The error messages are displayed on the screen can be printed out. If errors are encountered that are not described here, please contact pall.

SELF TEST

S.No.	Error Messages	Possible causes	Action
1.	Line pressure too low	Line pressure below 3000 mbar (43.5psi), subsequent not completed.	Increase in the Line pressure.
2.	Line pressure Unstable	Line pressure not stable enough	Check pressure supply.
3.	Self-test failed	Self-test failure	Check self-test printout for additional information. Repeat self-test with pressure supply. If service message continues to be displayed, then further service is required.
4.	Internal Error	Internal communication of the instrument disturbed.	Restart the self-test. If not successful contact pall instrument services.

FILTER TEST (WIT)

S.No.	Error Messages	Possible causes	Action
1.	Set up Error	Pressurization could not start.	Check if filter is connected and remote vent valve is operating.
2.	Line pressure is too low	Line pressure is too low or there are fluctuations in the compressed air supply.	Check/increase the line pressure.
3.	Line pressure unstable	Line pressure not stable enough	Check pressure supply.
4.	Pressure not obtainable	<ul style="list-style-type: none"> Major leak in the filter system under test. Filter not wetted completely. Filter has a major defect. Line pressure too low or fluctuating. 	<ul style="list-style-type: none"> Check systems for leaks. Rewet and retest filter. Replace filter if needed. Check line pressure.
5.	Flow outside limits	<ul style="list-style-type: none"> Leak in the filter system. Non-Integral filter. Filter not completely wetted. 	<ul style="list-style-type: none"> Check system for leaks. Replace filter if needed. Rewet (FF-Test) and re-test the filter.



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6.	Flow too high	<ul style="list-style-type: none"> Flow >1000ml/min (FF test) or >50 ml/min (WIT) Leak in the filter system. Non-Integral filter or filter not completely wetted. 	<ul style="list-style-type: none"> Check systems for leaks. Replace filter if needed. Rewet (FF Test) and retest filter.
7.	Flow too Low	<ul style="list-style-type: none"> Flow < 0.05 ml/min (FF test) or <0.001ml/min (WIT). Connection between filter and instrument interrupted/closed. Flow value for the filter too low to be measured (Small filters only). 	<ul style="list-style-type: none"> Check the test system. Re-wet (FF-Test) and re-test the filter. Replace filter if needed.
8.	Flow Unstable	<ul style="list-style-type: none"> Fast increase in flow during the measurement due to a leak filter de-wetting during the test. Fluctuating pressure. Fluctuating temperature. 	<ul style="list-style-type: none"> Check test systems. Check for temperature conditions.
9.	Downstream pressure too high.	<ul style="list-style-type: none"> Filter not installed or filter has a major defect. 	<ul style="list-style-type: none"> Check/Replace filter.
10.	External Valve Error	<ul style="list-style-type: none"> External valve not connected. External valve not opening. 	<ul style="list-style-type: none"> Check External valve.
11.	External Pressure Transducer (PT) Error.	<ul style="list-style-type: none"> External pressure transducer not connected. External pressure transducer defect. 	<ul style="list-style-type: none"> Check external pressure transducer. Check configuration if external pressure transducer is not used.

FILTER TEST (BPT)

S.No.	Error Messages	Possible causes	Action
1.	Set up Error	Pressurization could not start.	Check if filter is connected and remote vent valve is operating.
2.	Line pressure too low	Line pressure too low or fluctuations in the compressed air supply. Note : Line pressure must be >500mbar (7.25 psi) above the minimum BP.	Check/increase line pressure.
3.	Pressure not Obtainable	<ul style="list-style-type: none"> Major leak in the filter system under test. Filter not wetted completely. Filter has a major defect. Line pressure too low or fluctuating. 	<ul style="list-style-type: none"> Check systems for leaks. Re-wet and re-test filter. Replace filter if needed. Check line pressure.



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4.	Leak test Failure	<ul style="list-style-type: none"> Major leak in the filter system under test. Filter not wetted completely. Filter has a major defect. 	<ul style="list-style-type: none"> Check system for leaks. Re-wet and retest filter. Replace filter if needed.
5.	BP not obtainable	<ul style="list-style-type: none"> Final pressure is line pressure – 250 mbar (7.3 psi): Insufficient line pressure. Unusual BP curve does not allow detection of the bubble point. 	<ul style="list-style-type: none"> Check line pressure. Check connection between instrument and filter. Re-wet and re-test the filter. Replace filter if needed.
6.	Maximum pressure Reached.	<ul style="list-style-type: none"> Maximum pressure defined in the test parameters reached but no BP is detected. 	<ul style="list-style-type: none"> Check connection between instrument and filter. Retest the filter in a system with the higher tolerance. Replace filter.
7.	BP outside limits	<ul style="list-style-type: none"> Non-Integral Filter. Filter not completely wetted. 	<ul style="list-style-type: none"> Rewet and retest the filter. Replace filter if needed.
8.	Downstream pressure too high.	<ul style="list-style-type: none"> Filter not installed or filter has a major defect. 	<ul style="list-style-type: none"> Check/Replace filter.
9.	External Valve Error	<ul style="list-style-type: none"> External valve not connected. External valve not opening. 	<ul style="list-style-type: none"> Check External valve.
10.	External Pressure Transducer (PT) Error	<ul style="list-style-type: none"> External Pressure transducer not connected. External pressure transducer defect. 	<ul style="list-style-type: none"> Check external pressure transducer.

