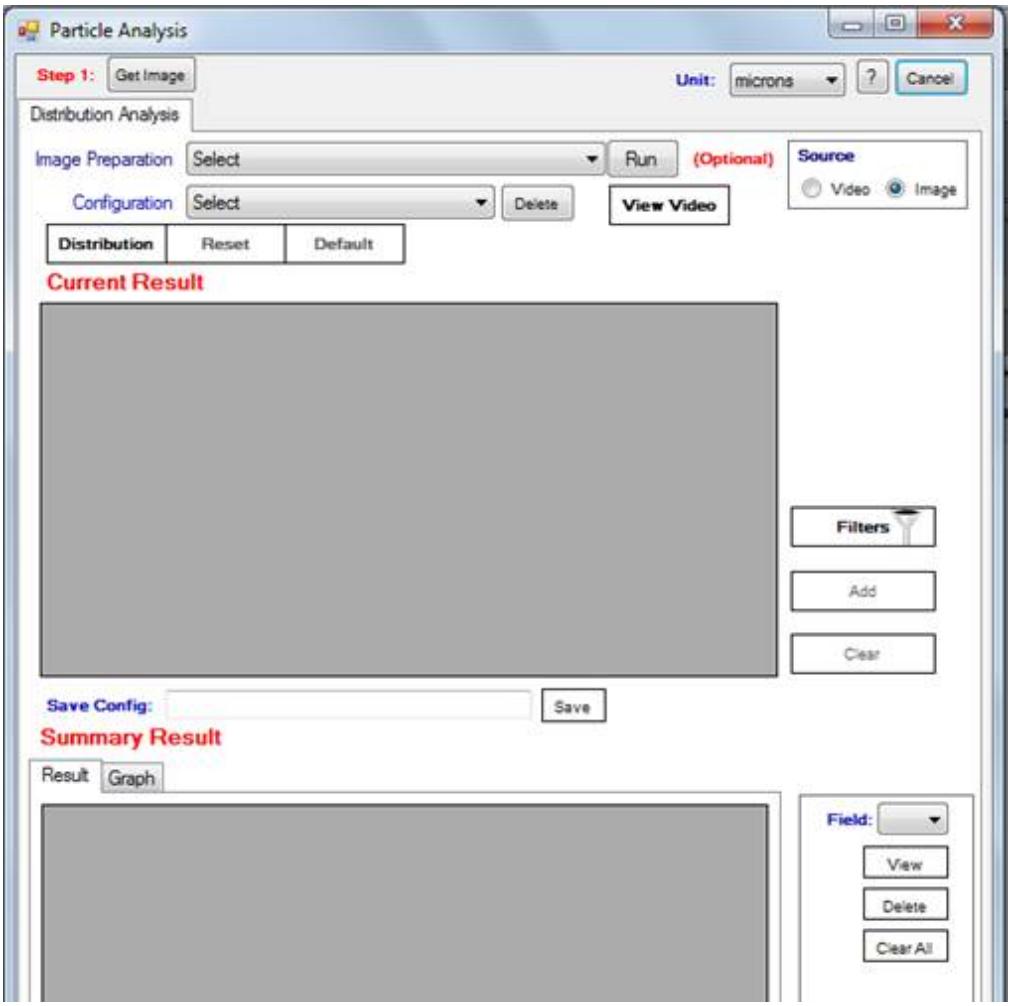
Porosity Analysis

This method can be accessed by “Measurementsà Porosity Analysis”. This functionality can do the particle count and analysis of particles in Millipore testing as well as in cases where user wants to analyze particles.

This functionality is same as Particle Analysis module.

The user interface for particle analysis is as below:



The method for Particle analysis is explained in below sections.

- Select the source – Video or Image. We recommend users to use image as the source, since any light variations or vibrations will not affect the

analysis steps.

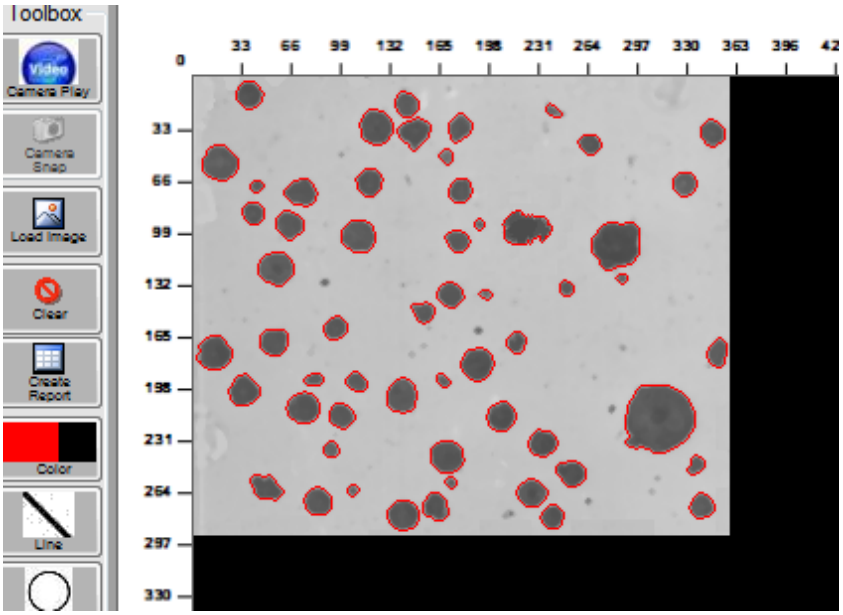
· Open the image.

· Before starting the analysis, you may need to do some option image cleanup functions. This can be done through custom built programs in “Image Preparation”. You can find more details about this step here. This is an OPTIONAL step.

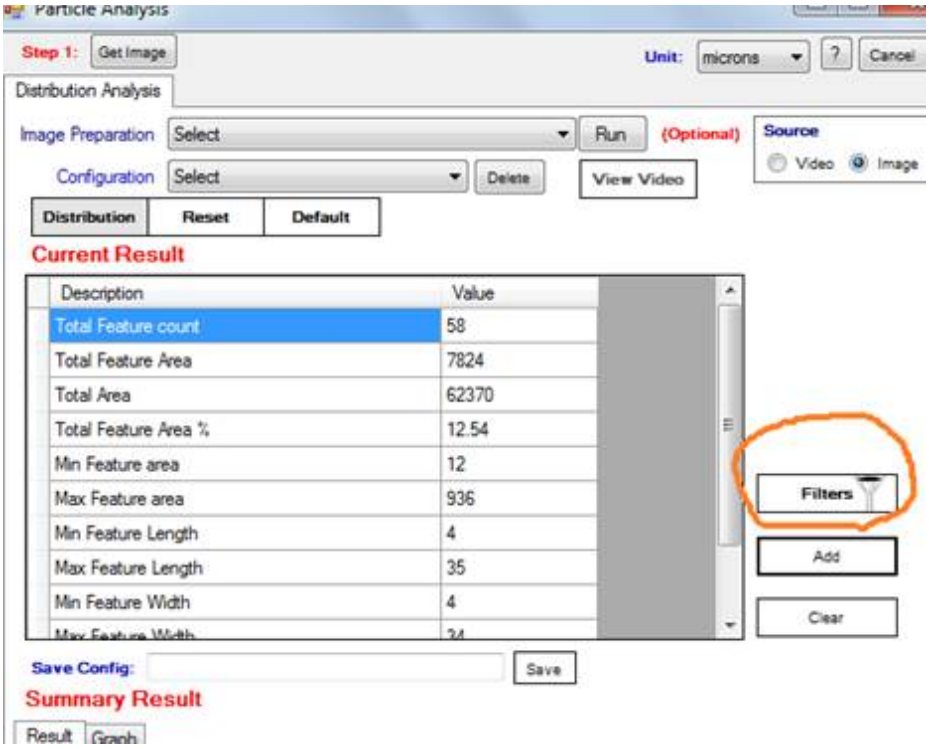
· Select the Filter (OPTIONAL), which will have the filter conditions set for removing unwanted features.

· Click on “Distribution” button

· You can see the image getting updated with particle detection according to the filter set, as shown below:



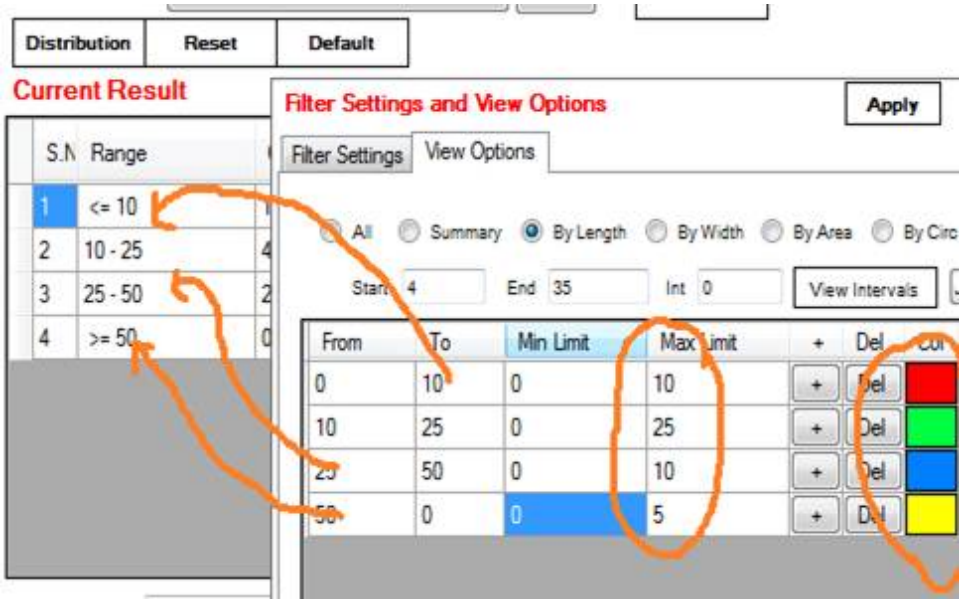
· By default, the summary result shall be shown as below



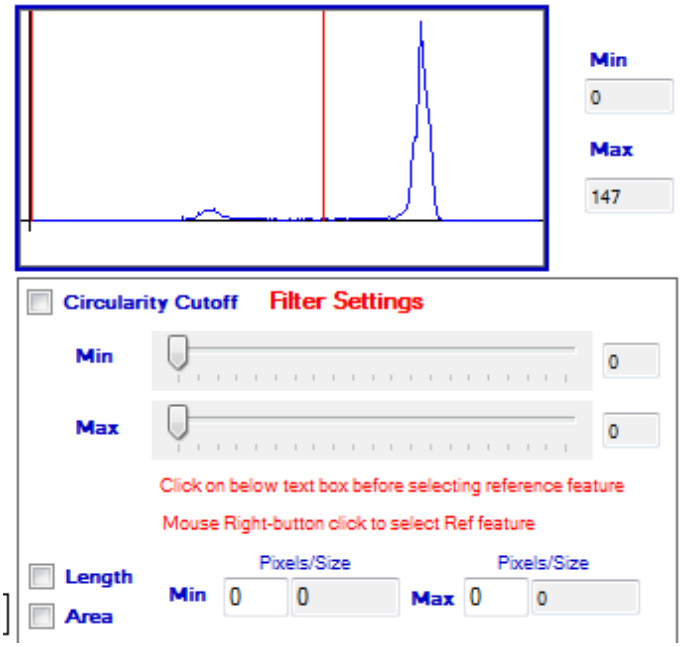
· If you want to change the threshold or put some filters on size or shape, click on the “Filters” button, on the right side of the Current Result box, as marked in the above image.

· You shall get a new window where you can set the threshold values, Shape filter (Circularity), Size filter (Length/ Area) as shown below.

· You can also set the view options on how you want to see the result, in the “View Options” tab in Filter window. You can view the result as Summary (Default), By Length, By Width, By Area or By Circularity. You can set the range for each bucket as shown below. You can also set the expected values (MIN/MAX), which is optional. If you have set expected values, system will give OK/ Not OK based on the actual result. You can also set the color with which the particles falling under each bucket to be marked in the image.



· You can also see the image histogram with the current threshold value in the histogram and filter settings as shown below



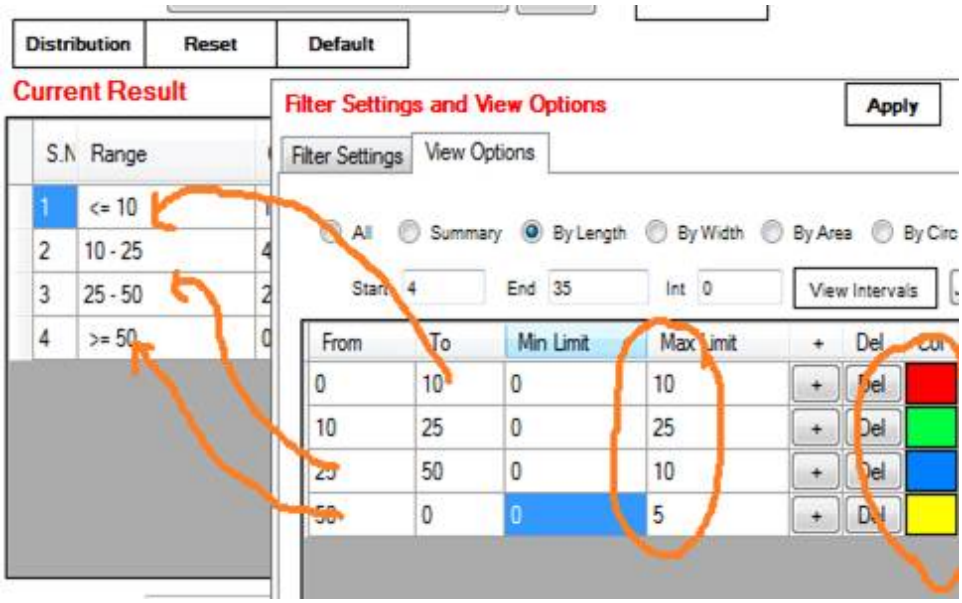
- You can adjust the threshold level by moving the vertical line (current threshold level) using mouse. As per the threshold value set, the system will upload the image with particle selection. This adjustment is needed to remove any noises and unwanted features from the image
- User can also set filters on length or area. To set the filter, user should first select Length or Area check box. User can then enter values directly in the Min and Max text boxes or can directly set the threshold values from the feature. For setting the values using feature as reference, first mouse click inside the Min or Max text box and then mouse right click on the reference feature on the image whose size (length/area) you want to use as threshold.
- After setting any filter, clicking on “Apply” button will apply the settings, and the results and image shall be updated according to the settings.
- The selected particles/objects shall be rounded according to the color set for each bucket in the “View Options”
- By default, selected particles/objects shall be marked with Red boundary.

- You can minimize/hide the Filter settings window by clicking on the “Minimize” button on it. Clicking again on the “Filters” button will open the Filter settings window with the values set.
- You can save the settings with a unique name by clicking on the “Save” button, after entering a valid unique name for the filter settings. Once you have saved the settings, you can recall it for next analysis from the “Configuration” box. After selecting a saved configuration, if you click “Distribution”, system will analyze and display result according to the filter setting opened. You can have any number of filter settings. To delete a setting, select the setting from the Configuration list and click on “Delete” button.
- If you move the mouse over each feature in the image, the details about the feature like its size, area and circularity will be shown on mouse tip.
- The result will be displayed in the text boxes in the window.
- You can select/un select a feature as Particle by using mouse left-button click over a feature, and the result will be immediately updated with the changes
- Once you have completed the above steps, click on “Add” button to add the result to the final result list
- The cumulative result shall be displayed in the “Result” tab, as per the Configuration setting. If user has selected “Summary” option, then summary result will be displayed. If user has selected “Detail” option, then each particle detail will be displayed in the Result tab. If user has selected other view options like “By length” or “By width” or “By Area” or “By Circularity”, the result will be displayed accordingly. To get more details on **View options**, please see **here**.
- User can repeat the process for all the images
- Once user has completed the measurement, reports can be generated in Excel or PDF format
- The reports will be according to the view options selected by the user

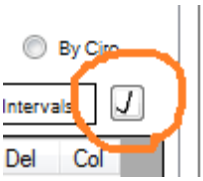
View Options

· View options gives the flexibility to the user to group the data as per the requirement

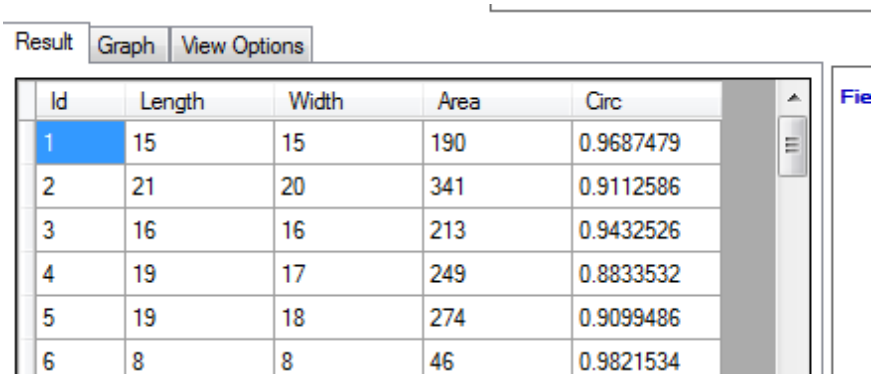
· The view options tab is as below:



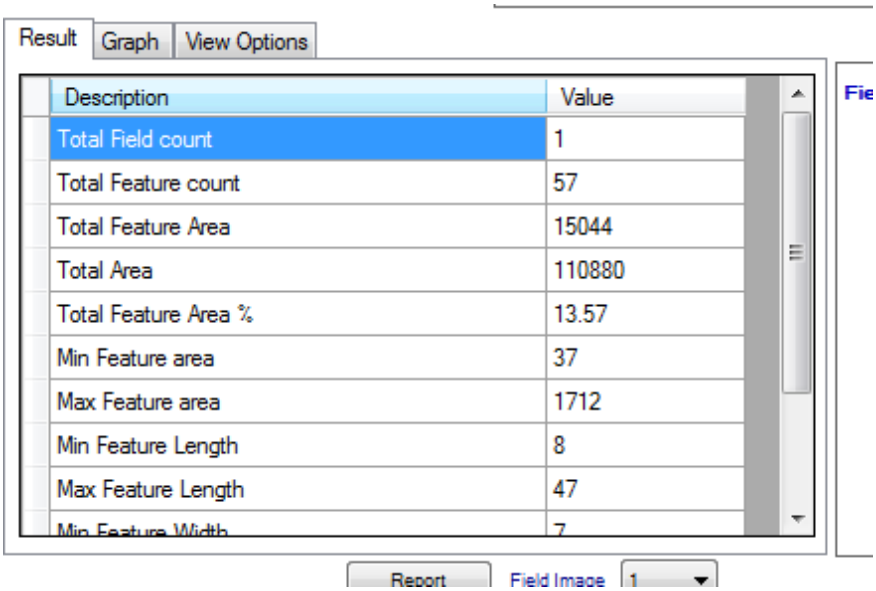
· User has to select All, Summary, By Length, By Width, By Area or By Circ and then click the OK button



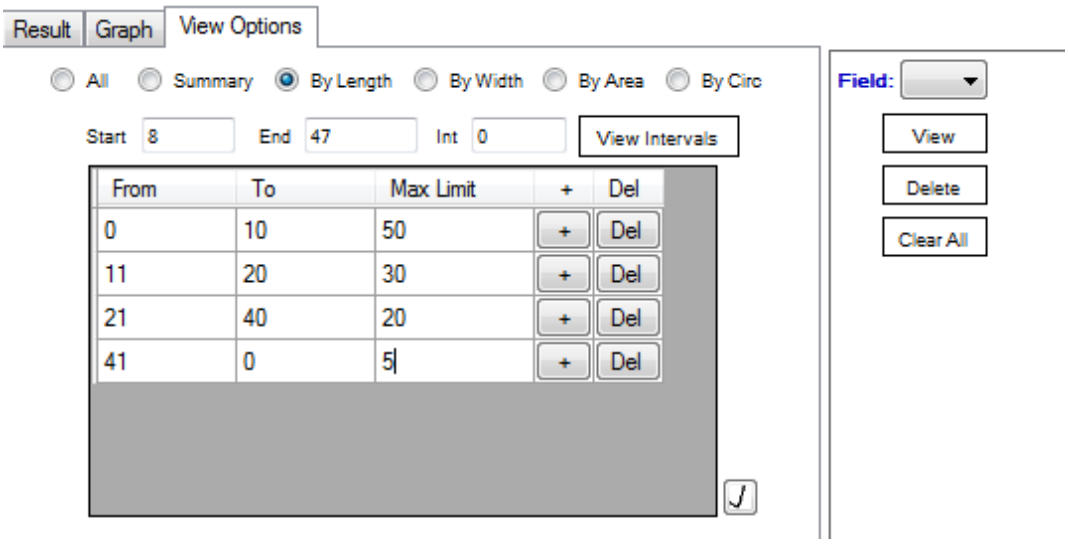
· User can select “All” option, if the details of each particle is needed. Result will be as below:



· User can select “Summary” option, if the summary of all particles is needed. The result will be as below:

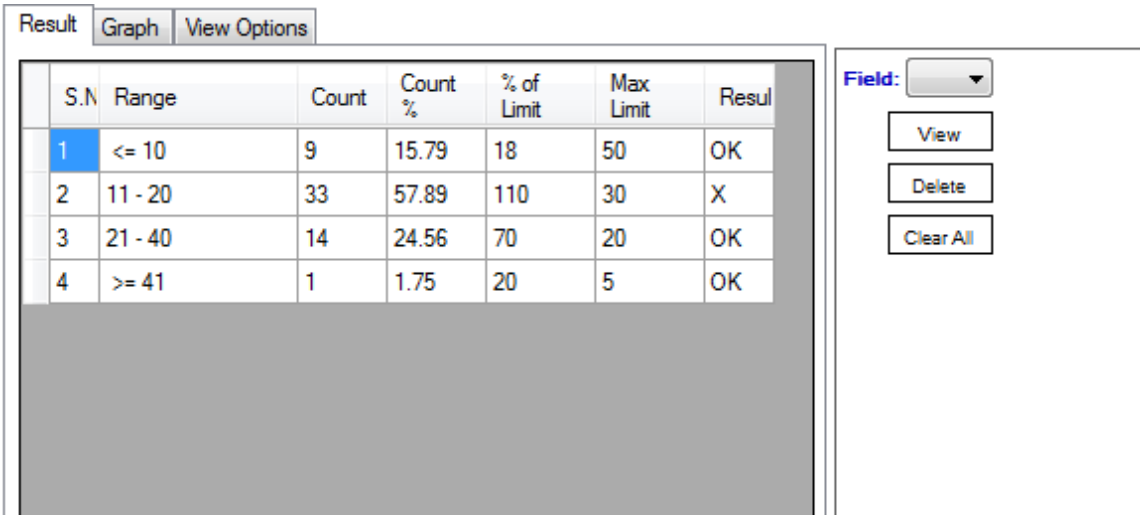


· If user selects By Length, By Width, By Area or By Circ, user has to enter the bucket size of group size according to which the data needs to be grouped. The screen will be as below.



· User can enter the From value, To Value and Max Limit (Optional). User can click on “+” button to add new row or “Del” button to delete a row. User can enter as many grouping as possible. In the above example, last row (From is 41 and To is 0) means a group with length

>=41 and no max value, and Max Limit is 5. If user clicks the OK button (marked with tick sign), the result will be as below



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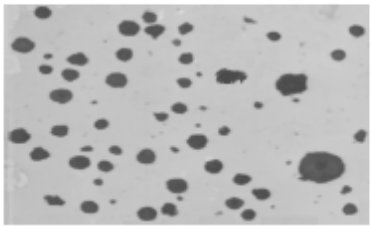
· Click on Report button to generate report in PDF or Excel. Report will have a graph for each group row, which shows actual count against max limit set. You can save these data as a configuration, so that you don't need to set the data grouping/bucket size every time. Enter a meaning full name under "Configuration Name" and click on Save button. This will save the filter conditions and grouping data with the system. Next time, user only needs to select the Configuration from "Filter" option and click on "Distribution" button to get the result, apply filter and group the data.

· An example report will be as below.

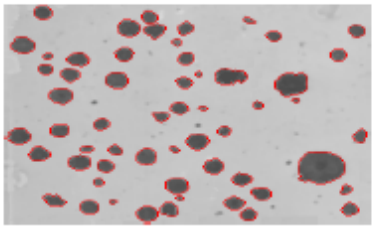
Particle Analysis Report

Customer:					
Part No:					
Date:	3/30/2015 7:31:10 PM	**Mag:**	100	**Calibration:**	1.33 µm/pixel
Unit:	microns	**Area:**	110880	**No of Fields:**	1
Specimen Name:		**Specimen Id:**		**Supplier:**	

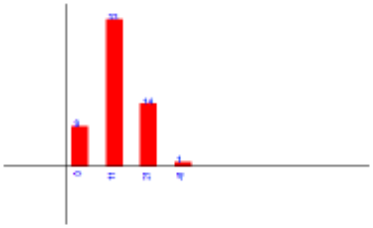
Original



Processed



No of samples	1
No. of Particles	57
Largest Particle: Len	47
Largest Particle: Wid	45
Smallest Particle: Len	8
Smallest Particle: Wid	7



Classification by Length							
Sr No	Range	Count	Count%	MAX	%MAX	% Of MAX	Result
1	<= 10	9	15.79	50	18		OK
2	11 - 20	33	57.89	30	110		X
3	21 - 40	14	24.56	20	70		OK
4	>= 41	1	1.75	5	20		OK

Result Summary: FAIL