

### Example: Grain Size Analysis - Manual Circle Method

This method is particularly well suited for measuring austenitic grain size of high alloy steels in general and specially for high alloy tool steels.

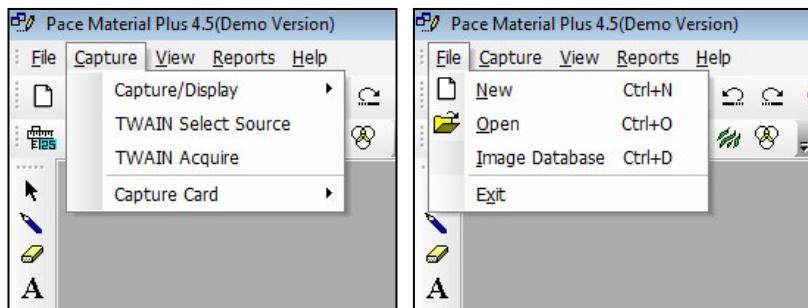
This method is recommended by ASTM for samples which have a poor etch, as well as for samples where the boundaries are either darker or less dark. In both cases the Automatic Method is not recommended for these samples.

#### PROCEDURE:

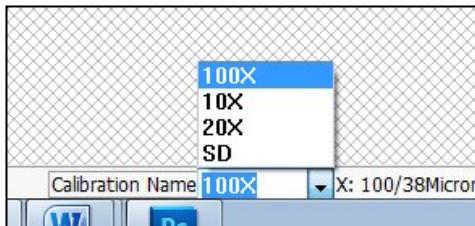
1. Load the image for grain size measurement.
2. Select the appropriate saved calibration scales from the drop down list at the bottom of the Window
3. Click on the Grain Size icon  either from the Toolbar or from the Menu-bar
4. Grain Size Measurement dialogue box will open. Select MANUAL CIRCLE ASTM method.
5. Click on SET THRESHOLD. A new platform with two scroll bars will appear. Move both scroll bars until all of the boundaries are properly pseudo colored (filled in red). Click OK.
6. Click DRAW CIRCLES. Three circles appear on the image.
7. Click the mouse on the points of the grain boundaries which are intercepting (touching) the circular lines. Small circles are formed once you click the mouse on an individual point.
8. Once all the points of the grain boundaries are marked, click APPLY. The average grain size is calculated automatically and is displayed.
9. Click ADD to place in grid.
10. To save the report, click on REPORT.
11. A sample information window will appear. Fill the required information. Click on "Save Data For Report Tool"
12. Click on "TO EXCEL" to see the result in Excel.

#### EXAMPLE of Grain Size – MANUAL CIRCLE ASTM Method

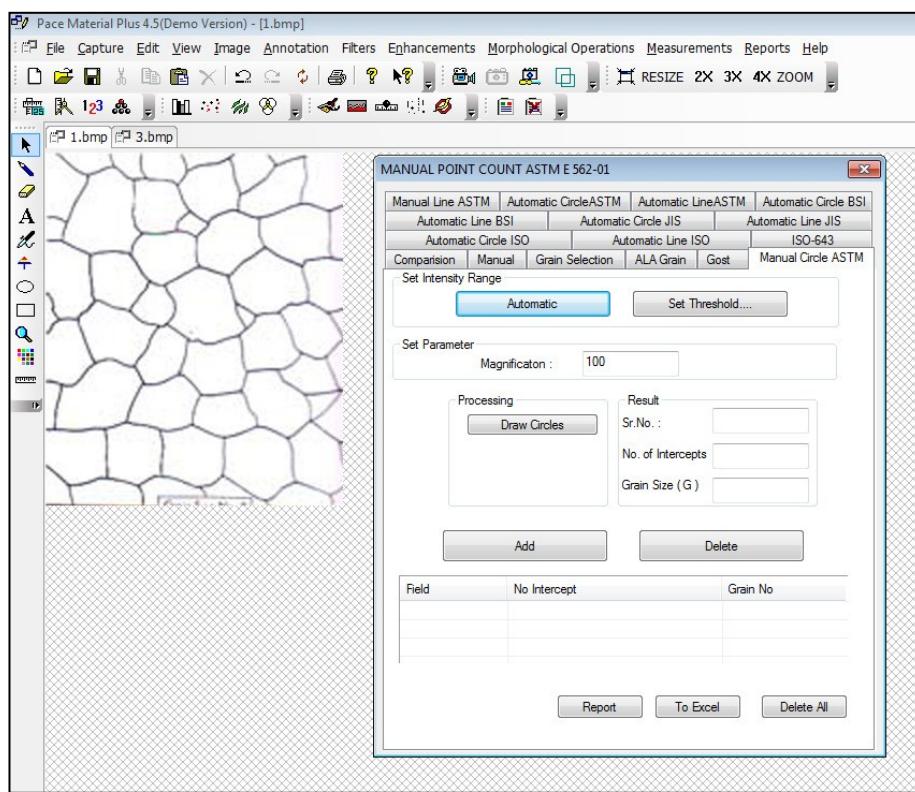
File > Open (select image) or Capture > TWAIN Acquire (for live image)



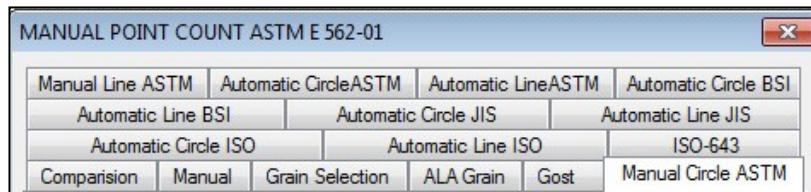
2. Select Calibration scale at bottom of the Window



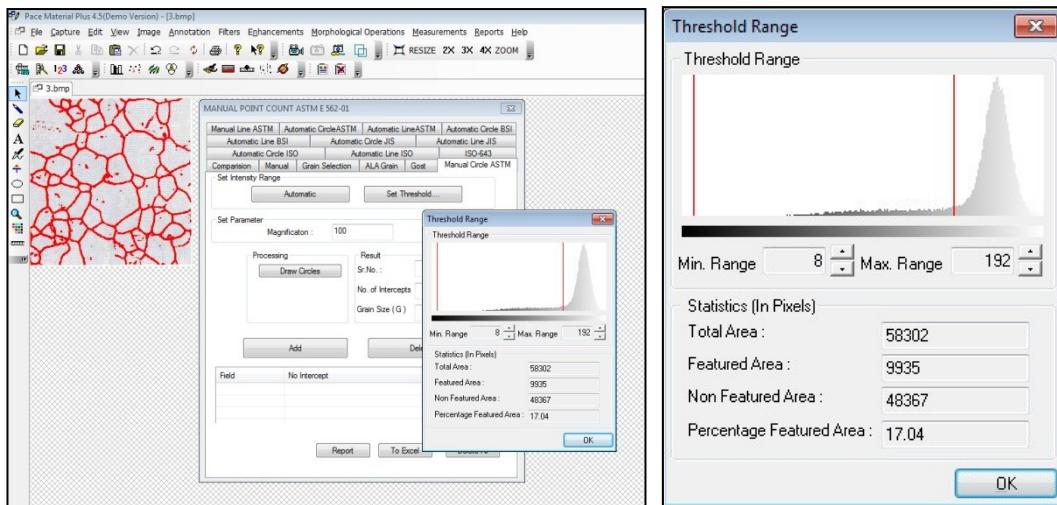
3. Click on the Grain Size icon  either from the Toolbar or from the Menu-bar



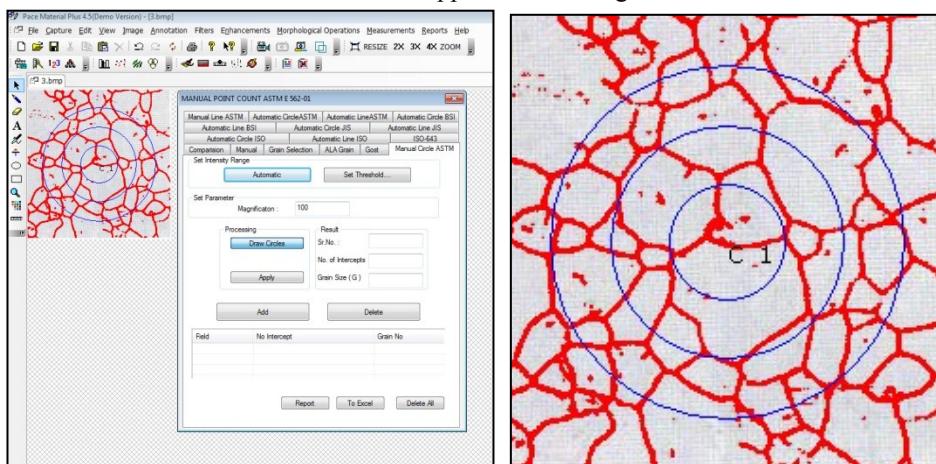
4. Grain Size Measurement dialogue box will open. Select MANUAL CIRCLE ASTM method.



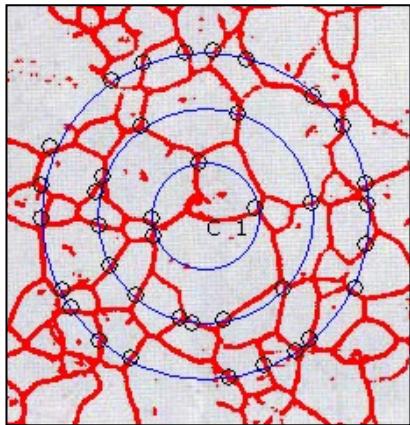
5. Click on SET THRESHOLD. A new platform with two scroll bars will appear. Move both scroll bars until all of the boundaries are properly pseudo colored (filled in red). Click OK.



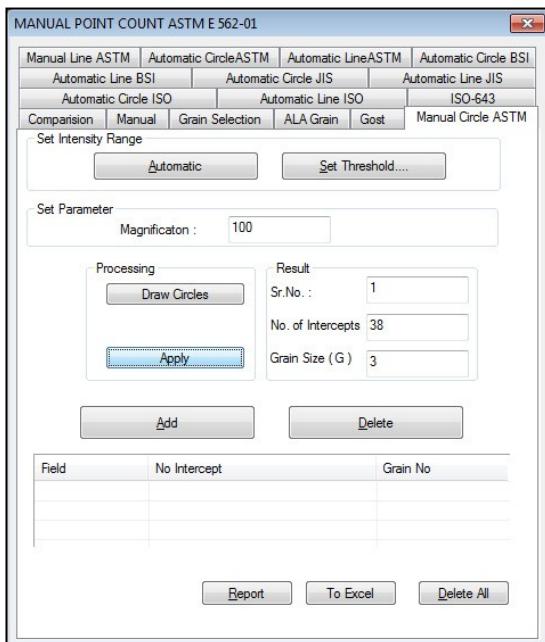
6. Click DRAW CIRCLES. Three circles appear on the image.



7. Click the mouse on the points of the grain boundaries which are intercepting (touching) the circular lines. Small circles are formed once you click the mouse on an individual point.



8. Once all the points of the grain boundaries are marked, click APPLY. The average grain size is calculated automatically and is displayed.

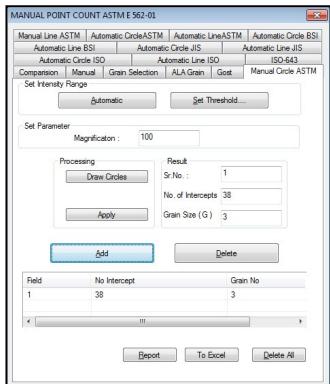


9. Click ADD to place in grid.



# MATERIALS PLUS

## Grain Size - Manual Circle



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11. A sample information window will appear. Fill the required information. Click on “Save Data For Report Tool”
12. Click on “TO EXCEL”

