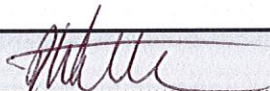
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DOCUMENT APPROVAL

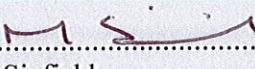
Author's Signature:

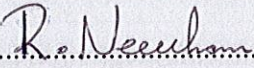
Your signature indicates that this document has been prepared in accordance with company standards or guidelines and adequately reflects the tasks and deliverables necessary.

Signature		Date	1 MAY 2018
Print Name	Adrian Worthington		
Title	Senior Operations Training Coordinator		

Reviewer's Signature:


Your signature indicates that, you have reviewed this document and that it accurately and completely reflects the tasks and deliverables necessary.


Signature		Date	2 nd MAY 2018
Print Name	Mark Sinfield		
Title	Head of Production		

Signature		Date	2 nd May 2018
Print Name	Rob Newham		
Title	Dual Site Operations Manager		

Quality Assurance/Compliance Approver's Signature:

Your signature indicates that this document complies with company standards or guidelines; and that the documentation and information contained herein complies with applicable regulatory, corporate, divisional/departamental requirements, and current Good Manufacturing Practices.

Signature		Date	03 May 2018
Print Name	Gary Crawley		
Title	Quality Assurance & Systems Manager		

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1.0 PURPOSE

- 1.1. The purpose of the document is to define the SOP (Standard Operating Procedures) to be followed by ADVANEX EUROPE Ltd, in order to ensure all Cirteq, circlip components are measured in a controlled and consistent manner.

2.0 SCOPE

- 2.1. The measurement method for the specified characteristics of the Cirteq, Circlip.
- 2.2. All personnel working on the section are responsible for ensuring that no changes are made to the process without full change control.

3.0 TERMS, DEFINITIONS & ABBREVIATIONS

- 3.1. Cpk. - Capability index.

4.0 HEALTH, SAFETY & ENVIRONMENTAL


- 4.1. Within the factory area Safety footwear is mandatory.
- 4.2. Within the factory area Safety glasses must be worn.
- 4.3. Ear defenders must be worn in the designated area of the factory.

5.0 ASSOCIATED DOCUMENTS

- 5.1. MeasurLink Data Entry (Document number AEU00241).
- 5.2. Works Order Instructions: Allowing full traceability for the batch.

6.0 PROCEDURE

- 6.1. General Instructions.
 - 6.1.1. All Circlips must be fully heat-treated in accordance with the Works Order Instructions before inspection is performed. The results from these checks will be statistically analysed to establish process capability.
 - 6.1.2. Open up MeasurLink Program. On the appropriate computer terminal set up the MeasurLink program, as described in document MeasurLink Data Entry (Document number AEU00241). In the 'Run ID' box enter the Works Order number followed by a '-' and the machine number, for the SPC tests ensure that the SPC version of the component type is selected and it is saved in

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the specific SPC folder, when entering the traceability data ensure that the number for the box currently being worked on is entered

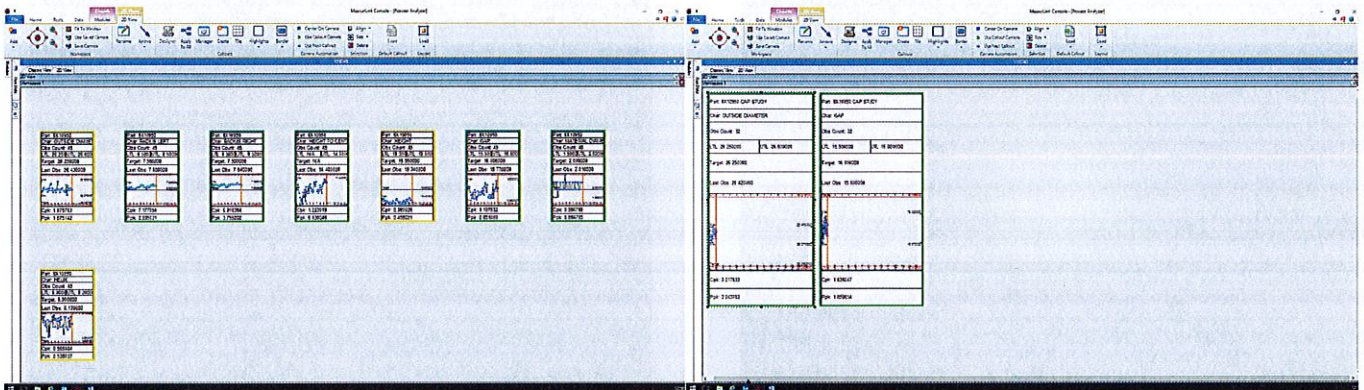


Figure 1: MeasurLink screen showing a results entry page for both a full dimensional and SPC inspection.

6.1.3. Use of MeasurLink. Measure the dimensions in the order they are detailed in on the MeasurLink screen using Figure 1: as an example of both a full dimensional and SPC inspections.

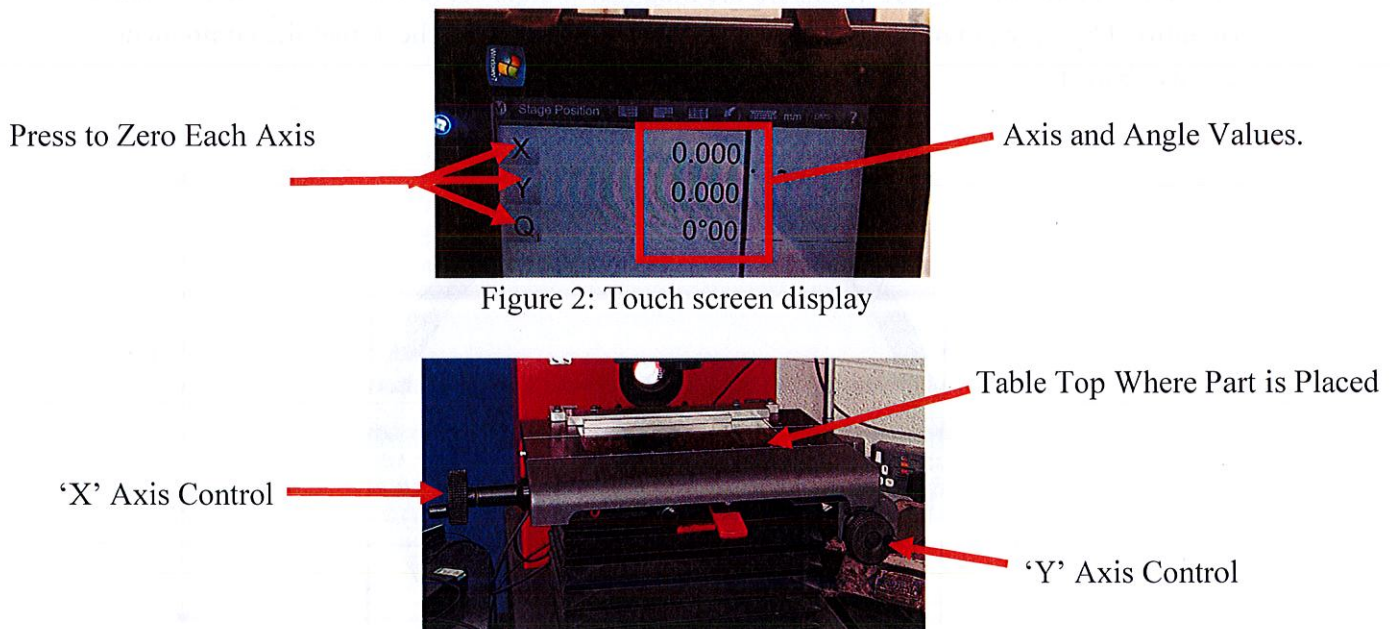



Figure 3: Shadow graph table with axis controls.

6.1.4. Use of the Shadow Graph Controls. Figure 3 shows the controls for the x and y axis. Wind the handles to move the table. Figure 2 shows the touch screen display. Press the axis letter to zero the measurement value.

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6.2. Measurements.

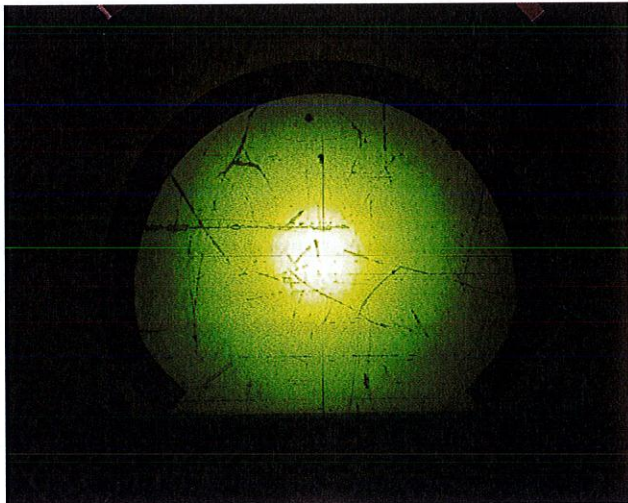


Figure 4. Component in place flat on the glass.

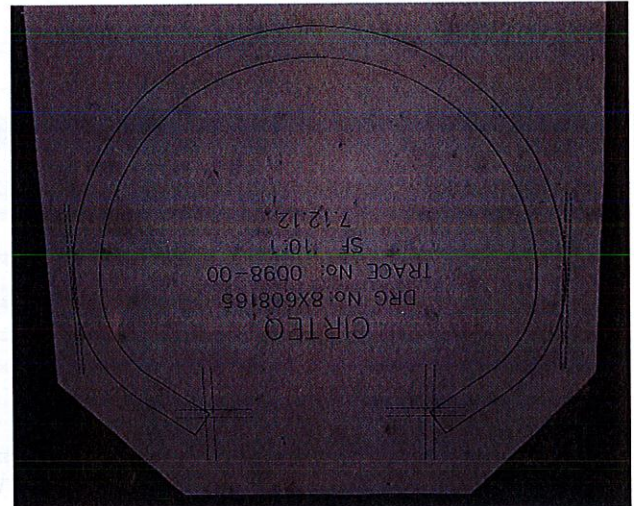


Figure 5: Trace used to lay over shadow graph projection.

6.2.1. Set up for measurement. Place the component flat on the glass stage of the shadow graph projector, as shown in figure 4. Ensure the magnification is set to 10x. Use the correct trace (identified by drawing number) and place it over the display to check that the component is evenly shaped.

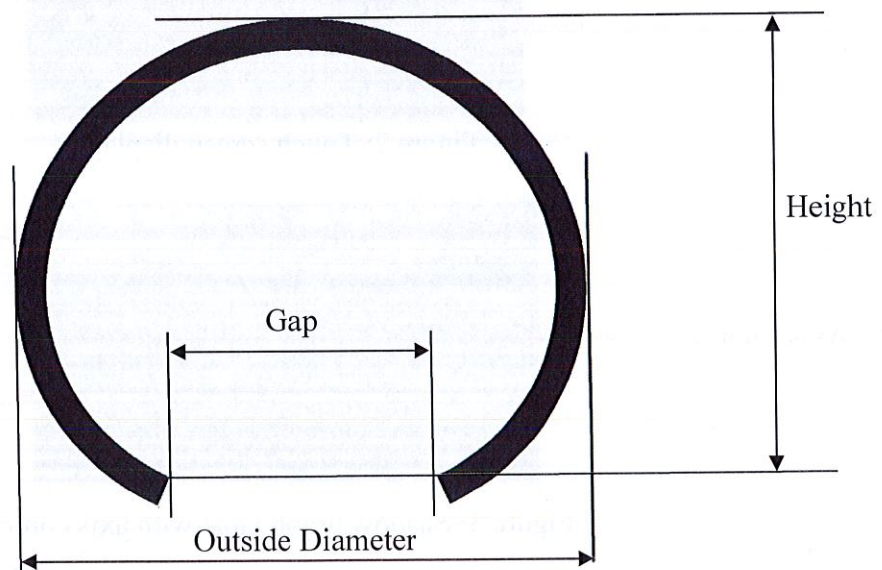



Figure 6. Dimensions to be checked.

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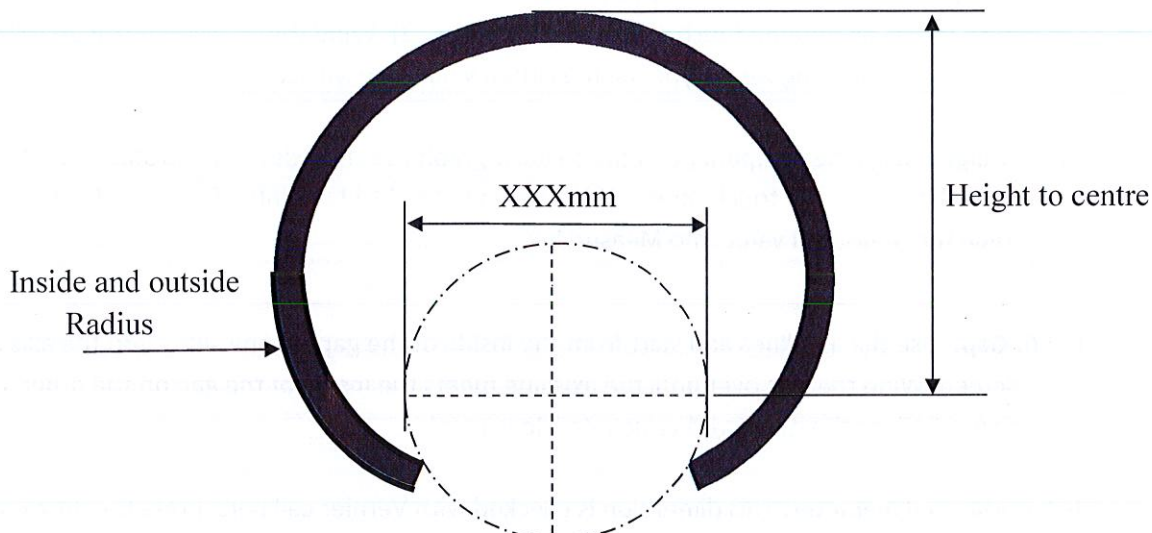


Figure 7. Dimensions to be checked

6.2.2. Outside diameter. This dimension is checked with Vernier callipers as shown in figure 8. Press the data entry button to send the value to MeasurLink.



Figure 8. Outside diameter being measured by Vernier callipers

6.2.3. Left and right radius. Place the component on the shadow graph as shown in figure 4. Check the dimension shown 'Radius' in figure 7. Use the radius trace to measure one side of the part at a time, see figure 9.

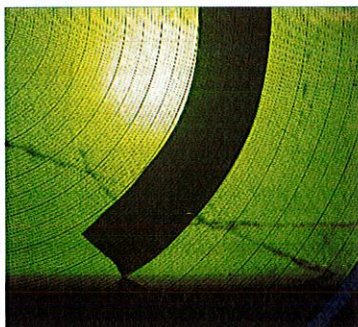



Figure 9. This is the trace placed over the component to measure the Radius.

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6.2.4. Height to centre. Use the radius trace to find the XXXmm dimension (figure 7) found on the drawing. Zero the 'Y' axis on the touch screen display (figure 2). Wind the 'Y' axis control up to the top of the part, as shown in figure 7. Type the measured value into MeasurLink.

6.2.5. Height. With the component on the shadow graph use the axis lines and start from the top of the part. Zero the axis on the touch screen. Wind down to the inside points of the gap. As shown in figure 5. Type the measured value into MeasurLink

6.2.6. Gap. Use the axis lines and start from the inside of the gap on one side. Zero the axis on the touch screen. Wind the axis over until the axis line meets the inside of the gap on the other side, as shown in figure 6. Type the measured value into MeasurLink.

6.2.7. Material diameter. This dimension is checked with Vernier callipers. Press the data entry button on the Vernier to send the reading to MeasurLink. See Figure 10.

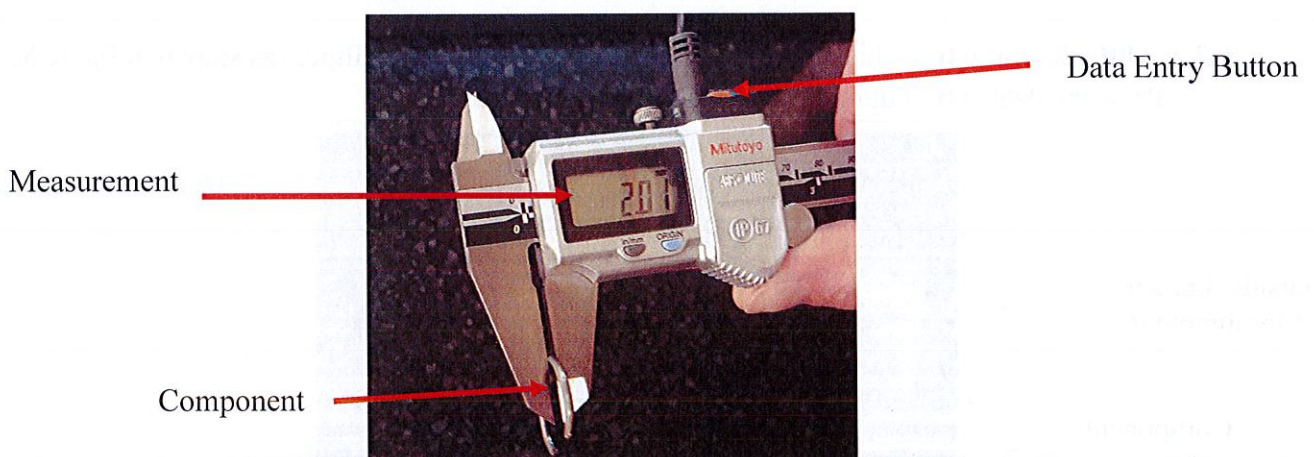


Figure 10. Vernier callipers measuring the material diameter.

6.2.8. Helix. Place the component on the shadow graph table and position it between two plates as shown in figure 11. On the viewer measure between the two plates to get the helix measurement. Figure 12. You may need to re-focus to get a definite line on each plate.



Figure 11. Component positioned between two plates

Measure between
these 2 points

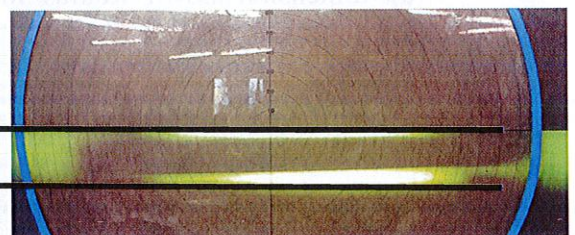



Figure 12. Component shown on the viewer and measuring points

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6.3. Task completion.

- 6.3.1. 5 parts must be checked on each dimension before moving on to the next dimension. When the required number of test samples have been entered into MearsurLink, choose either 'Suspend' if there will be more values to enter at a later stage or 'Close Run' if the values taken will be the last for the order.

