Gage R and R user guide

1. To conduct a “Gage R and R” test, you will firstly need to have a “perfect panel” usually these need to be created yourself. For this use a thick panel and etch on some pads, a square pattern with 4 targets as this allows for more testing. (drilling 4 holes in a square pattern also works for the same purpose).

2. Once a “perfect panel” has been acquired firstly measure the panel 10 times without moving it.

3. Measure the panel a further 10 times whilst moving the panel in between measurements.

4. Then measure the panel 4 times while rotating 90 degrees each time. The same squareness should be seen each time.

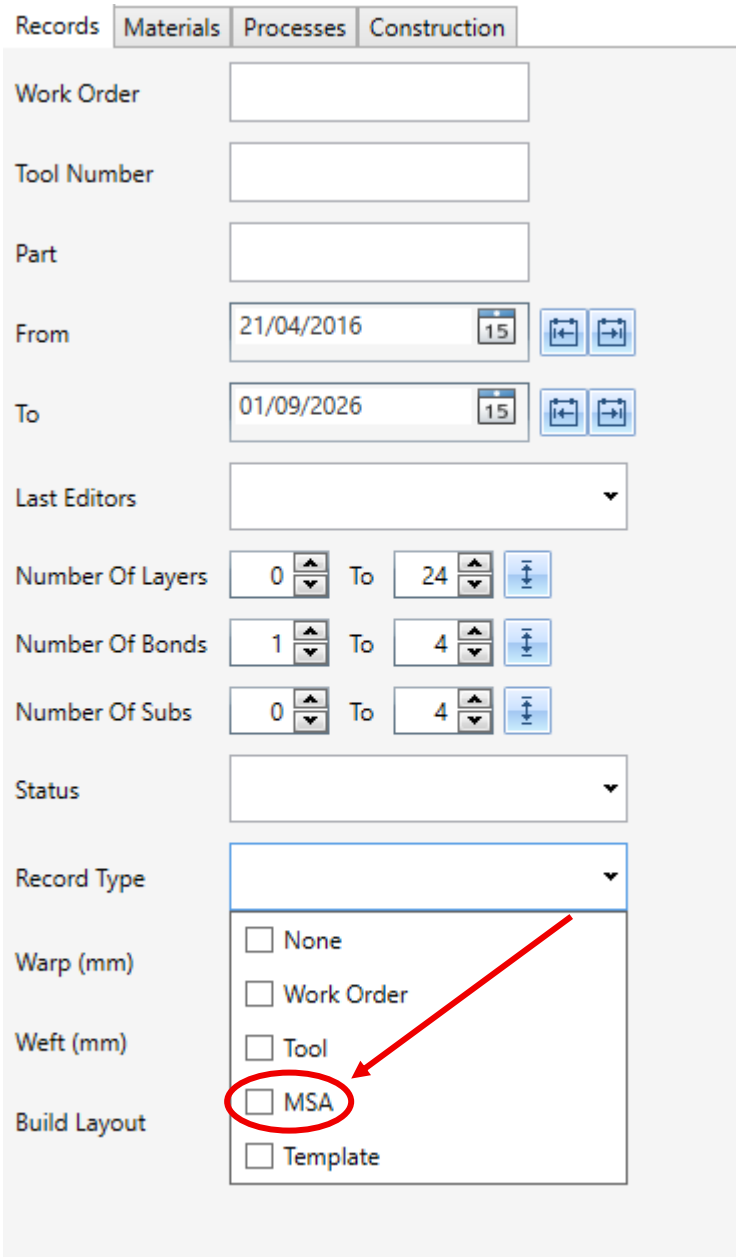
   (It should be noted that for steps 2 and 3 you can take more than 10 measurements to obtain more data however 10 is usually substantial.)

5. It is then best to repeat these steps with a different operator to determine the operator-to-operator error. This can be done multiple times.

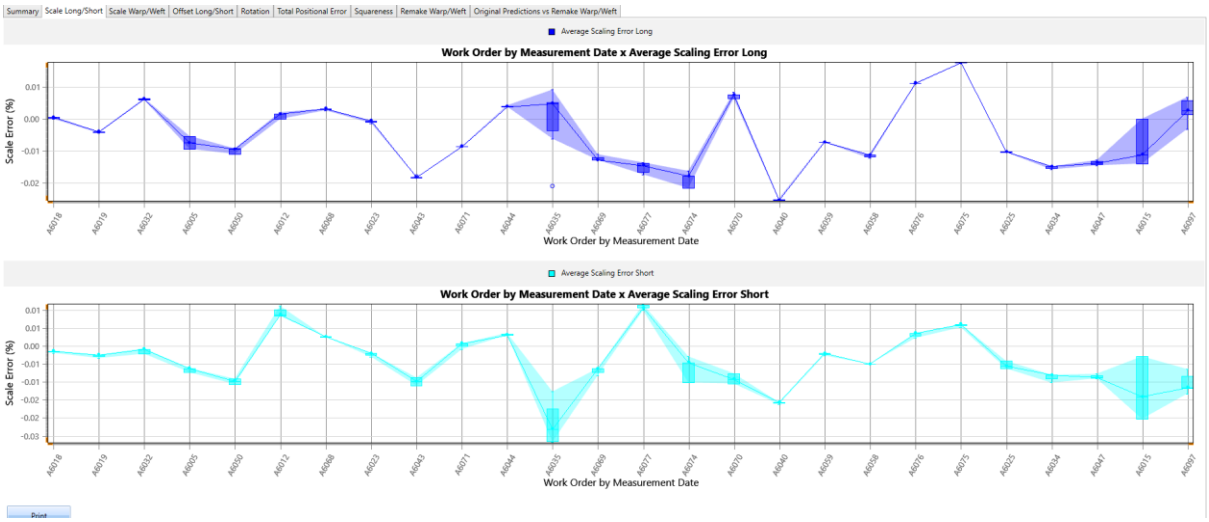
6. When inputting all the measurements from the Gage R and R test to the “Xact GX3” system, ensure that the record being made has been changed and set to an “MSA” record as these will not be looked at when creating your predictions for actual manufactured panels.

7. You can then look at all your data collected to determine the repeatability and reproducibility of the machine you are using. This can be done by looking directly at the data collected in Xact and finding the variation between measurements.

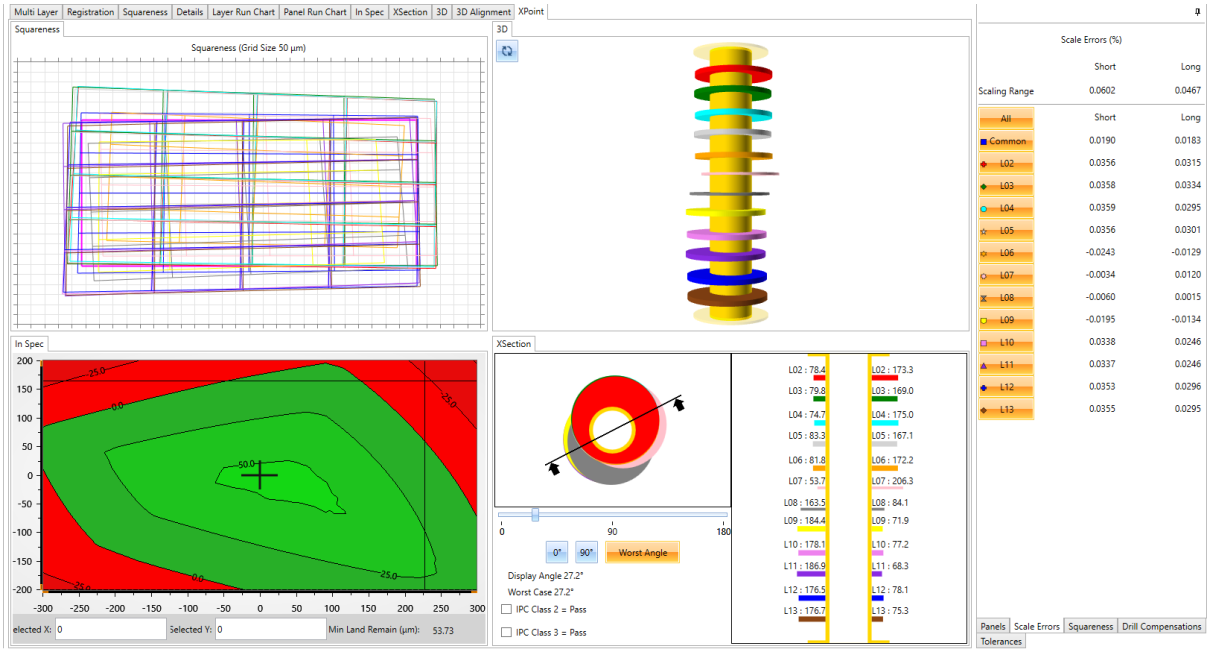
8. The data collected can be presented in numerous ways by using “Xplain”. This can be done by filtering down the search function to include only the work order number you have named your “MSA” panels as or simply changing the record type to “MSA and then pressing the xplain button.



9. This will then allow you to look at the xplain graph to show the data collected.



You will also be able to click into the individual points on xPlain to look at specific measurements to view the registration in more detail using the various tabs such as xPoint which will display not only the squareness of the layers but also a heat map showing where the biggest area of error is within the panel. Xpoint also shows a 3D rendition of the layers to see how they all line up. Xpoint can be seen in the screenshot below)



For more information on the process of conducting a Gage R and R test I will leave a link to an informative website to read through below.

https://www.msicertified.com/define-gage-repeatability-and-reproducibility/