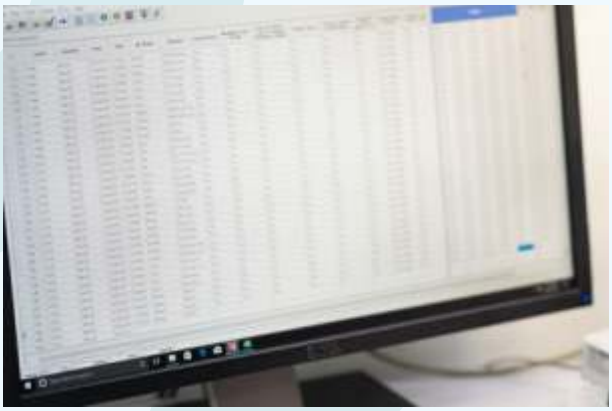
# W&S Plastics

## Quality Assurance - Capability Verification Analysis

Issue 17

This white paper provides some detail on our **capability verification analysis** (CVA) process, one of the many methods that we employ to ensure consistent quality of the parts that we manufacture. Specifically, we conduct capability analysis on all major tools each time they make 20% of their quoted life.



During qualification of a new or modified tool we conduct a normal capability analysis on all dimensions on 5 shots and on inspection and significant dimensions on 125 shots. This forms a baseline for future comparison.

Our standard quality inspection process requires that for a part in production we conduct metrology for:

- Inspection dimensions every 2 hours
- Significant dimensions for the first off and last off of a run

**To provide an additional measure of confidence that we continue to produce parts that have not varied from those that were qualified, we introduced our Capability Verification Analysis.**

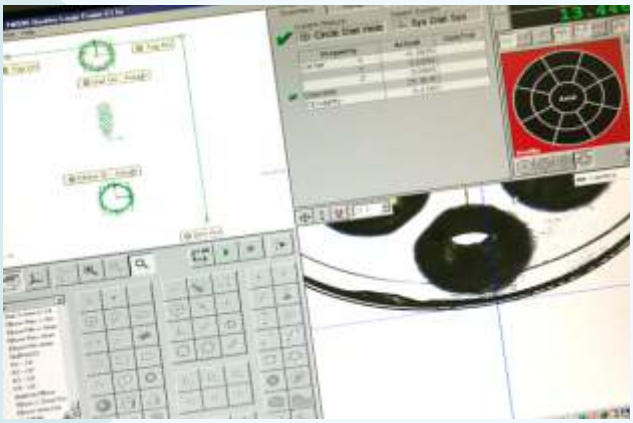
Conducting a capability verification analysis on an already qualified and running tool allows us to identify, through the use of scientific analysis, whether the tool or process has drifted from its initial approved process, in a way in which SPC control charts may not. If a drift is found to have occurred we investigate why and determine ways to correct it if necessary.

A CVA highlights the expected proportion of product that is estimated to meet specification, as indicated by the process capability index (Cpk), and provides the opportunity to tighten our internal specification limits to more closely monitor specific dimensions during production.


Our CVA process involves the analysis of 30 shots with metrology conducted on all inspection and significant dimensions. Minitab's Normal Capability Sixpack Tool is then used to evaluate the process capability of each dimension.

Our NPI Engineers compare the results of the process capability index (Cpk) to the initial PPAP submission or past CVAs to identify any dimensions which may have drifted. Variations which indicate an increased potential to produce out of specification product are reported to the Engineering team who will decide what actions may be taken. Their preliminary investigation will determine if it is a tooling issue or a process input variation, indicated by trends or step changes across multiple dimensions and may initiate a more comprehensive investigation by our technical moulding team.

In the past 12 months we completed CVAs on almost all of the parts manufactured in our Johor, Malaysia plant and more than 30 studies in our larger and more diverse plant in Sydney, Australia.



This process is just one of many employed within our advanced quality systems that ensure that the quality of the parts that we provide to our customers meet the standard that they expect.

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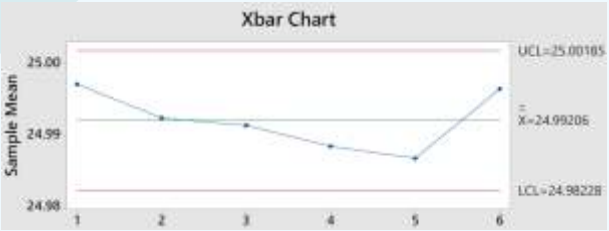
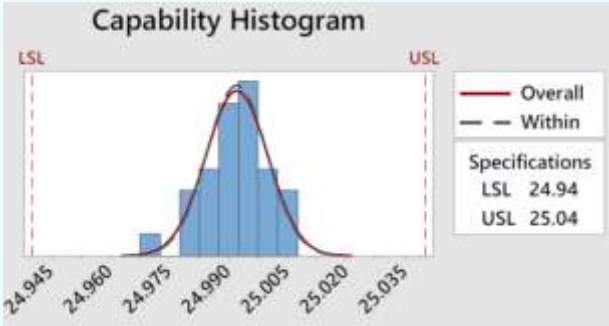
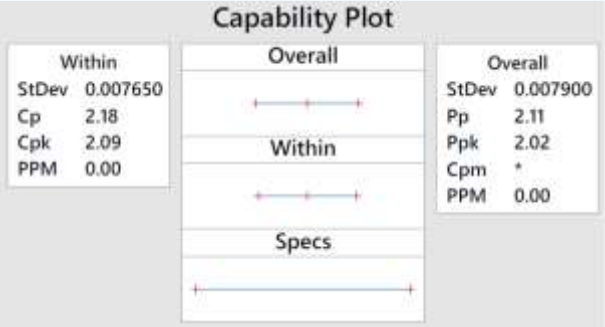
The following is an example of the data collected and analysed on a part for demonstration purposes.

Process running well – centred on target with Cpk > 2 and 0 PPM out of spec.

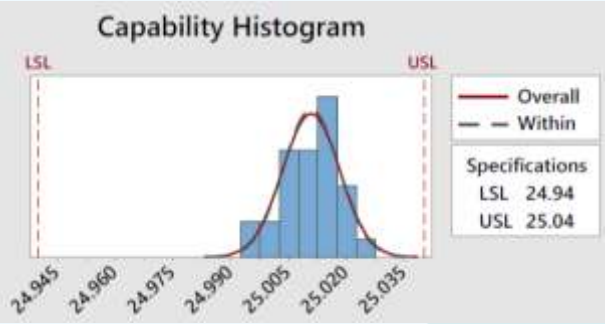


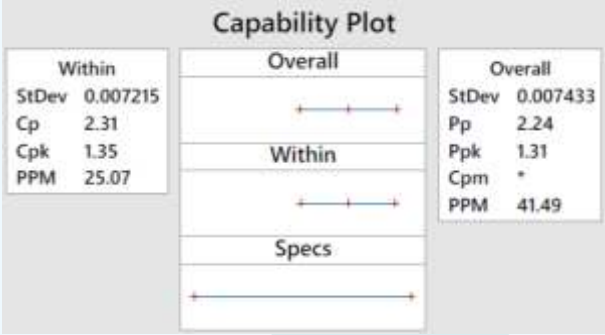




On the next CVA, the run chart still looks good.


But the mean has shifted. No data points found out of spec, but Cpk is decreased to 1.35 and predicted out of spec parts has increased to 41 PPM if across multiple batches.




Further investigation is required.

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