DATALYZER International
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Integrated APQP: Drawing - Ballooning – CMM - Control Plan - SPC

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Integrated APQP: Ballooning , Control Plan, SPC

INTRODUCTION

During APQP, critical characteristics are established in the control plan. These characteristics are measured on a CMM (e.g. during First Article Inspection) and during production (e.g. during regular SPC checks).
The process of registering all characteristics can be very time consuming. Characteristics are established during the design process and then they need to be entered in the CMM program, the control plan and the SPC program. A time consuming step for suppliers is that they often need to balloon the drawing from the customer as well.
This document describes how this can be done efficiently.

BALLOONING

When the drawing is in dwg, dxf, igs or pdf format the ballooning can be done with the Infra Convert software.
When the ballooning is activated the balloons are added to the drawing and the list of characteristics is also available.

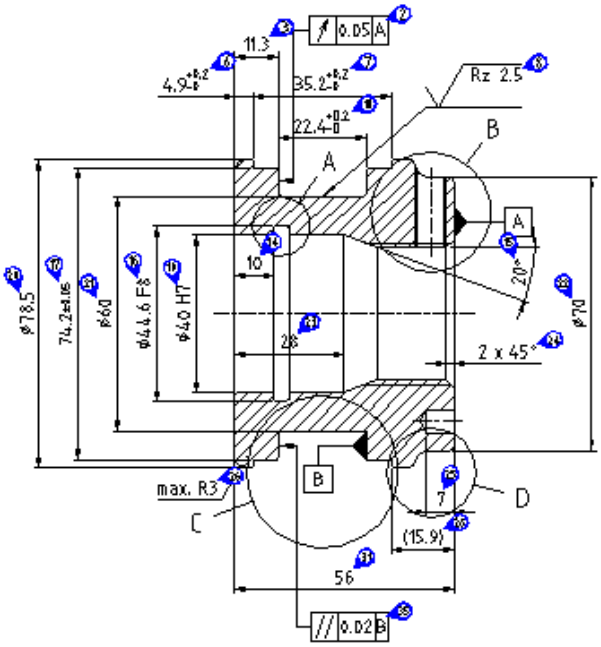


Figure 1: Example dwg drawing with balloons

In addition to the balloons the full list of characteristics can be exported to a prf file.

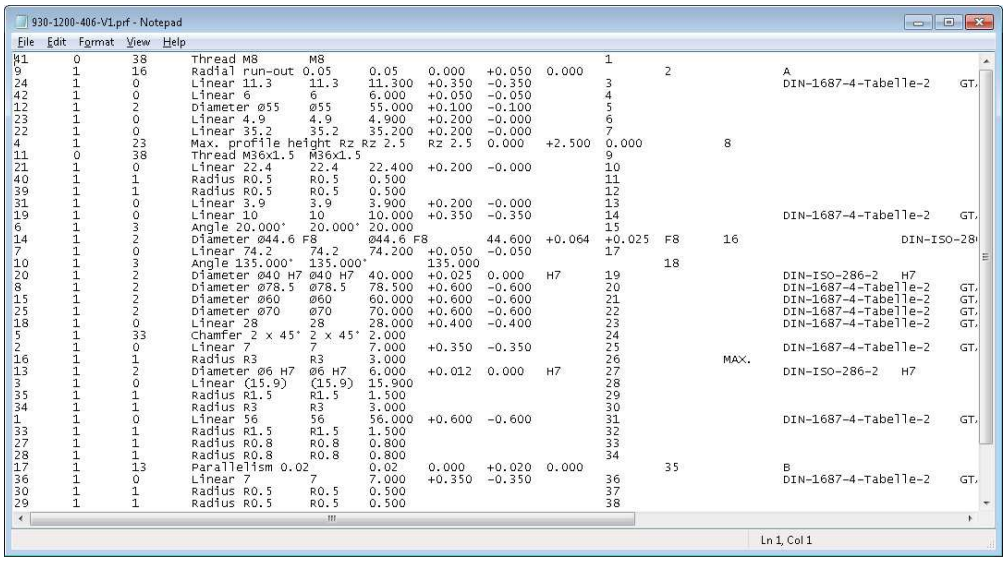


Figure 2: Example prf file

The list is also available in a format that can be automatically imported (for example into the Calypso CMM software).
The next step in the process is to create the control plan to establish what needs to be measured during the different APQP stages.

CONTROL PLAN

The control plan will be created based on the FMEA. It contains the steps defined by the FMEA.

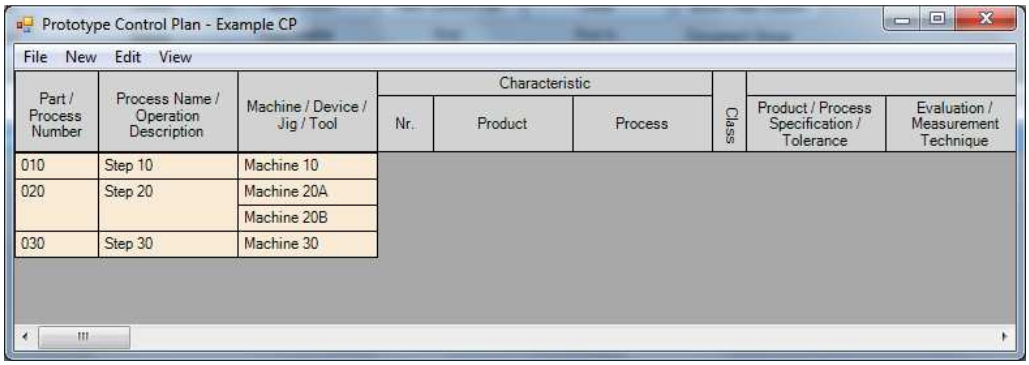


Figure 3: Example Control Plan

When importing characteristics from the prf file, you will need to add the characteristics to the appropriate machine/device/jig/tool field. When possible, you also need to add the contents of the other fields that are not available in the prf file into the control plan.

You can accomplish this by first importing the prf file into an internal table.

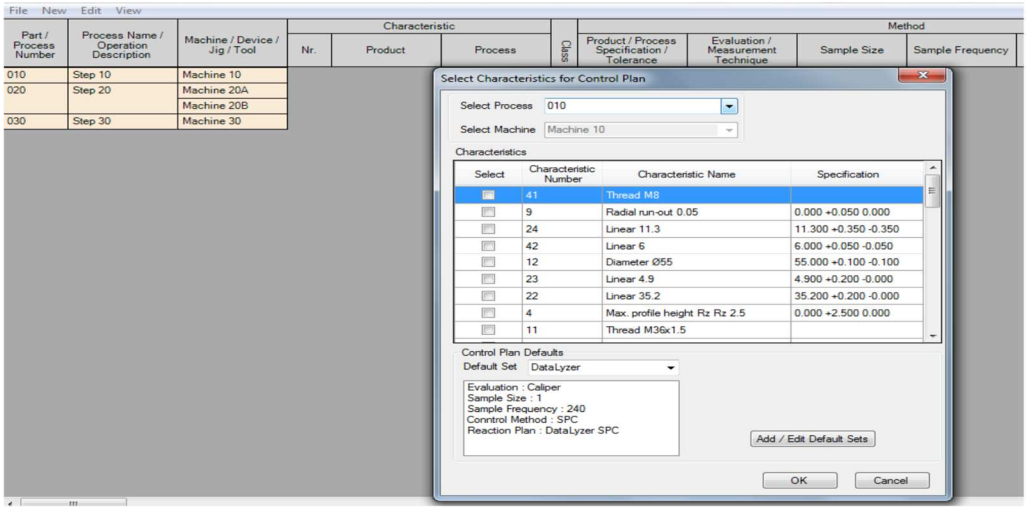


Figure 4: Import table to assign characteristics to process steps

When the prf file is imported into the table, the data is converted so it will fit in the control plan format. The table also offers the option to select a default set for the additional fields. For example, a fixed subgroup size is often used for all characteristics. That information can be added in a default set. Another example is if you want to refer to a standard out of control action plan (OCAP) for this product, then you can add this entry as a default for the reaction plan field.

After the default sets are complete, select the characteristics per process step/machine field.

When finished, the characteristics are added to the specific process step and the list is updated. You can then select the following step and select the appropriate characteristics for that step

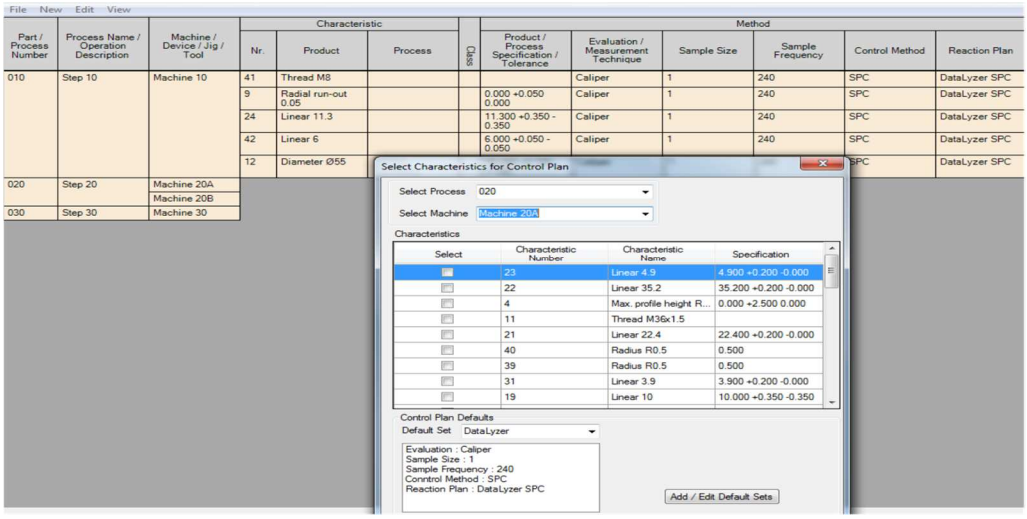


Figure 5: Assigning characteristics to steps/machine

The process continues until all relevant characteristics are added to the process step.

Control Plan - SPC

In the next step the characteristics are entered in the DataLyzer Spectrum SPC module.

Like described above, you can derive an internal table and can then add a default set for the remaining fields. Depending on the SPC configuration, different default options can be used.

The control chart setup screen is then automatically filled with the required information.

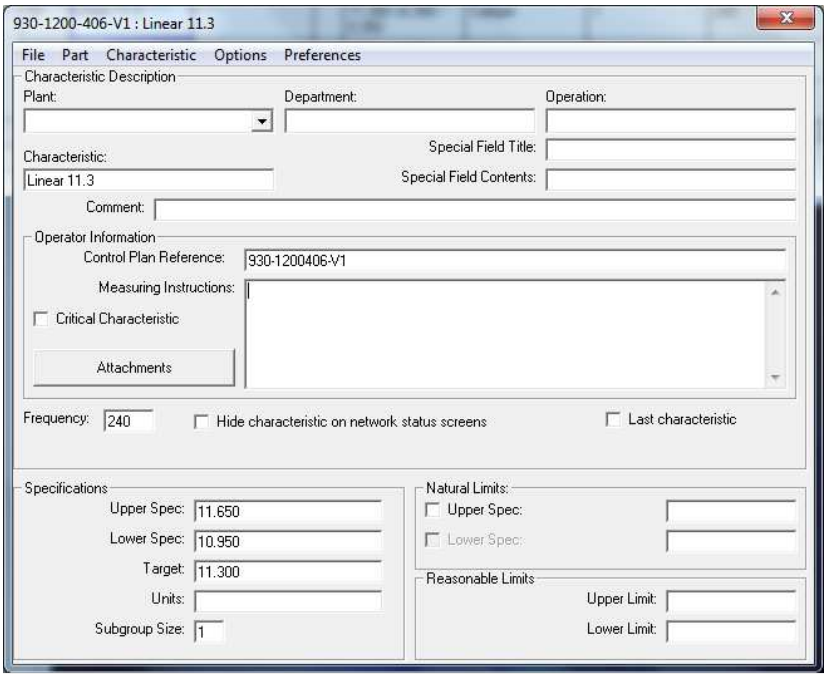


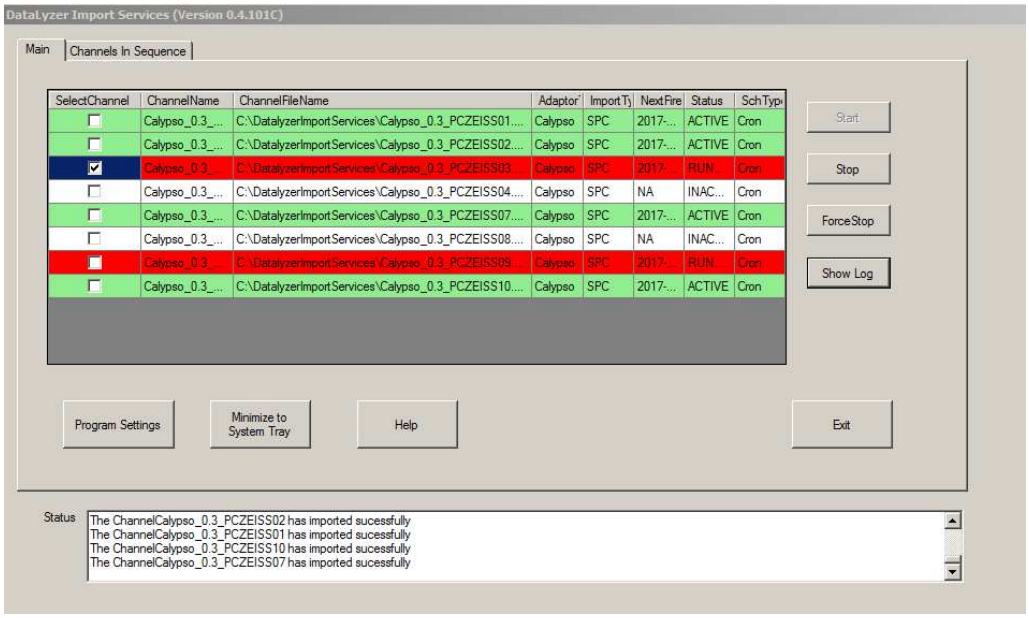
Figure 6: SPC Chart setup from the Control Plan screen

The SPC system can be used for regular SPC checks and also for First Article Inspection or importing from the CMM.

CMM – SPC

Part of the data might be measured using a CMM. In that case it will be helpful that data is automatically imported from the CMM. DataLyzer offers a solution that the setup of characteristics will be done automatically when importing CMM data. A special import service monitors the CMM data and imports it into the control charts. When a control chart is not existing it will automatically create the chart based on the data in the CMM file.

Below you see an example how Zeiss Calypso is integrated with DataLyzer SPC and data is imported automatically for 8 CMM machines in production



DataLyzer SPC import service for Zeiss Calypso CMM

Conclusion

Using the integrated Ballooning – Control Plan – SPC solution in combination with import capabilities from the CMM machine saves a lot of time in the setup of all requirements and offers an advanced solution to control your process.

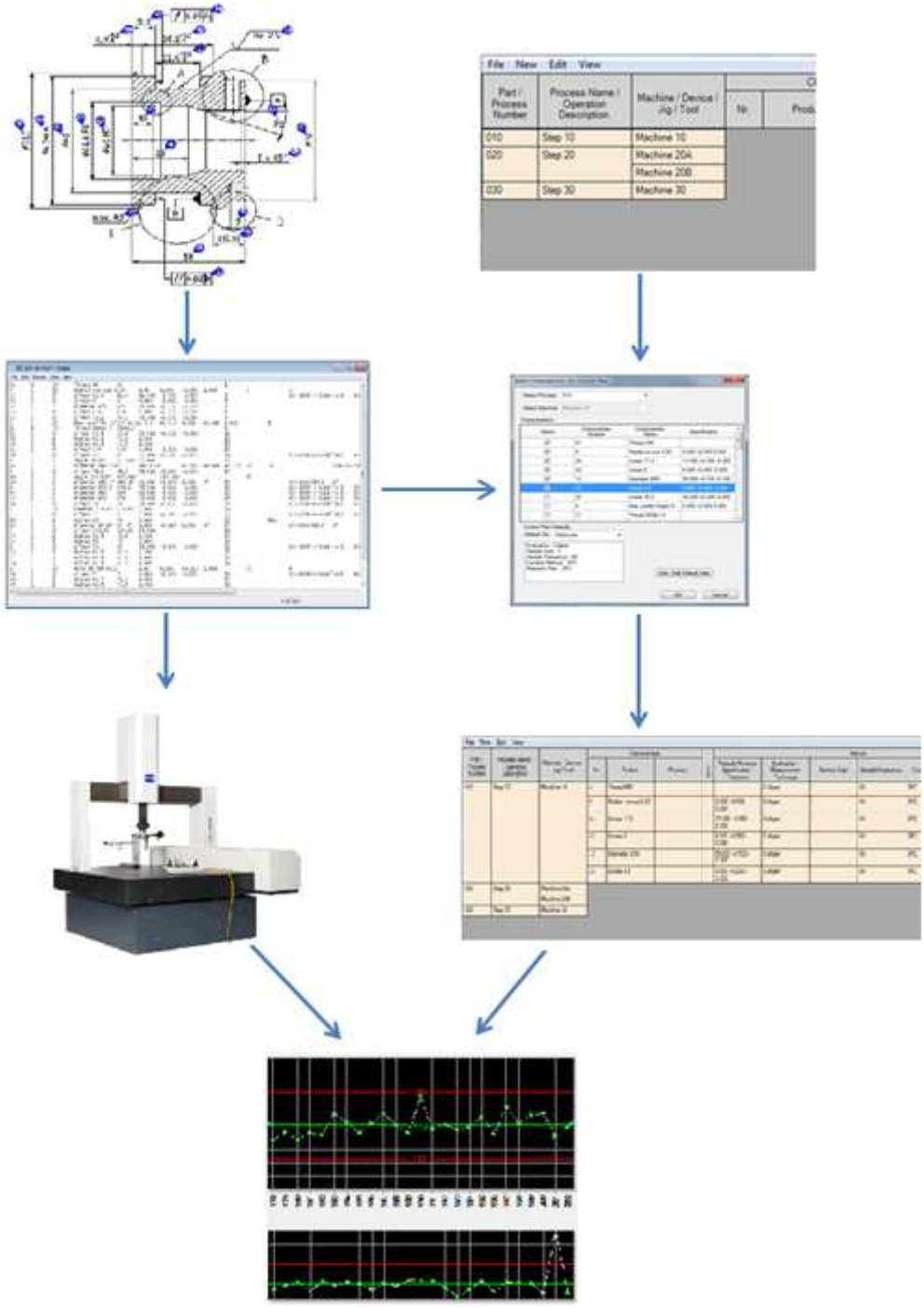


Figure 7: Integrated solution Ballooning – Control Plan – CMM - SPC