EVALUATING VISCOSITY AUTOMATION

GUIDELINES

saint clair systems
TEMPERATURE & VISCOSITY CONTROL

Evaluating Viscosity Automation

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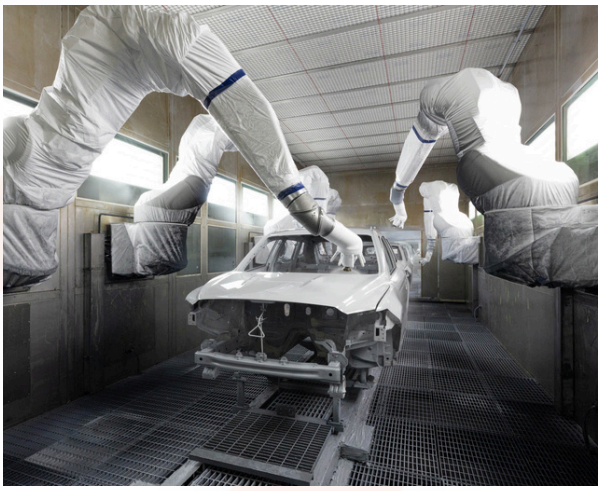
01 Establish Goals



The first step is to answer two questions:

- What you would like to accomplish?
- Is it something that can be helped by automating viscosity control?

If these two questions cannot be answered clearly, we recommend pausing until they can.

Targets we have established in the past include:

- Labor Savings
- Coating/Material Savings
- Solvent Savings
- Quality Improvement
- Throughput Increase

Regardless of the target, you must establish a consistent and effective method of measurement.

Whether you are using % change, $ change, labor hours or something else that makes sense for your process, it must be measurable.

Finally, make sure that you have a method to correlate the data you are collecting with your overall goals.

02

Establish Baseline Measurement

Before you start looking at making improvements to your process, make sure you know how it is performing today. If you do not already have a consistent method for measuring and recording viscosity, develop one.

To establish your baseline, review with your team and agree on a reasonable period of time to collect data. Try to incorporate normal temperature swings from day to night, shift changes, solvent additions, and any other normal events that may cause variation in your data.

Collect the data the way you operate now. If you check viscosity twice a day, don't decide to do it hourly for the baseline calculation. The baseline should be a realistic representation of your normal operations.

Do not rush through this. If your baseline measurement is too high, you may decide not to make an improvement that benefits you. If your baseline measurement is too low, you may invest time, effort, and money into something you do not need.

Once you have the baseline established, make sure your improvement target is something worth attaining. This may include doing a return on investment calculation.

03

Establish System for Correlation

Now you need to make sure you have a system to correlate your viscosity measurements to your goals.

Sometimes this can be simple. For example, if your goal is to eliminate the labor required for viscosity measurement and adjustment, it is easy to calculate the labor saved by automating the control.

Other times it might be a little more complex. For example, if your goal is a reduction in paint blistering, you may have to wait until the part you are coating has gone through a complete manufacturing cycle before you discover the blistering.

While simple to do, it can be overlooked.

With the first three things in place, you're ready to install a viscometer.

04

Install Viscometer in Process

The purpose of installing a viscometer in your process is to identify your issues with manual viscosity control. The goal is to find a place as close to the point-of-application as practical. The viscosity of the coating, as it is applied, has more impact on the finished product than the viscosity at the drum or mix room.

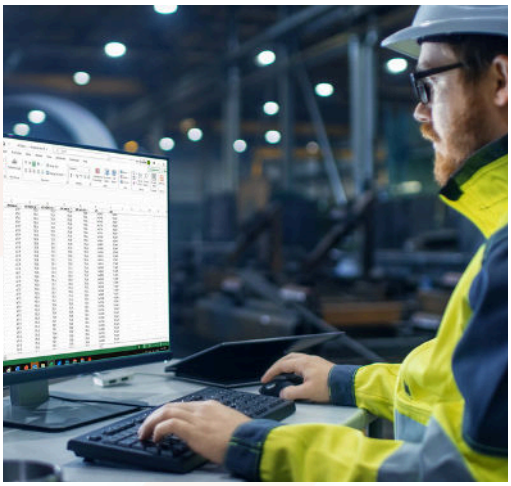
The first step is determining where to place the viscometer. Find a place as close to the point-of-application as is practical, (considering ease of access and installation).

The second step is establishing a system for collecting the data transmitted by the viscometer. This can be an existing control system, or an inexpensive process data logger. Anything capable of capturing either a 4-20 mA or RS-485 signal. Capturing raw data in real time is important. Processing the data is simple.

Finally, install the viscometer, calibrate, and verify data collection.

Now you are ready to collect data to compare to your manual process.

05 Collect Data



Collecting the data is the least demanding part of the evaluation. If your team did everything correctly during the installation phase, the data collection will take little effort.

First, agree on the amount of time you will collect the data. We recommend approximating the time and conditions you used for the Establishing the Baseline step. Again, incorporate normal temperature swings from day to night, shift changes, solvent additions, and any other normal events that may cause variation in your data.

Next, establish the time intervals for the automated data collection. Your process viscometer can log data as frequently as you require to do your analysis. The more data you collect, the more effort it will take to retrieve and process the data. However, not collecting data frequently enough may leave you with inadequate information.

For example, if you decide to collect data every two seconds, you will have over 43,000 data points per day. If you collect data every five minutes, you will have less than 300 data points per day, but you may miss events like replenishing a drum with virgin coating and the impact that it has on the process. Since viscosity shifts are typically not rapid, select an interval that is manageable, but still capable of supplying useful data.

Finally, we recommend reviewing the data regularly to make sure that the viscometer is providing useful data. While not common, there are circumstances that could cause inaccurate readings. It is an inexpensive way to prevent logging data and finding it unusable.

06 Compare Data to Target

In step three of this guide, we established a system for correlation. This is where we use that system to look at the data we collected and compare it to our improvement targets.

As there is often a lag between the time of the viscosity measurement and the measuring of the improvement target, make sure you have a system that compares the viscosity at the time of application to the parts coated at that time.

Does any correlation exist? If you cannot draw a clear line between viscosity shifts and your improvement targets, you should consider ending this evaluation. There is some other element of your process that you should address before automating viscosity control.

The only caveat to this would be that you are systematically addressing key variables in your manufacturing process, and you would like to eliminate or minimize them one by one. If this is the case, you may want to continue the evaluation.

If there is a clear correlation between viscosity shifts and your improvement targets, continue to the next step of automatically controlling viscosity in real time.

07 Control Viscosity

Now that you have a working process viscometer, and a system for correlating viscosity changes to your improvement target, you can consider automating viscosity control.

If you were using something other than a viscosity controller to collect data, you will need to install one. Your viscometer supplier should be able to provide one as a demonstration unit to validate the effectiveness of automated control.

Once the viscosity controller is installed and operational, you will need to install the valves used to dispense solvent, (water with water-based coatings), and virgin material. These valves will receive a signal from the viscosity controller to open as required to maintain your desired viscosity.

After training, calibration, and functional validation, you are ready to start controlling your viscosity with automation.

Using the same methodology used in the Collect Data section of this guide, start collecting data. Again, we recommend reviewing the data regularly to make sure that the viscometer is providing useful data. While not common, there are circumstances that could cause inaccurate readings. It is an inexpensive way to prevent logging data and finding it unusable.

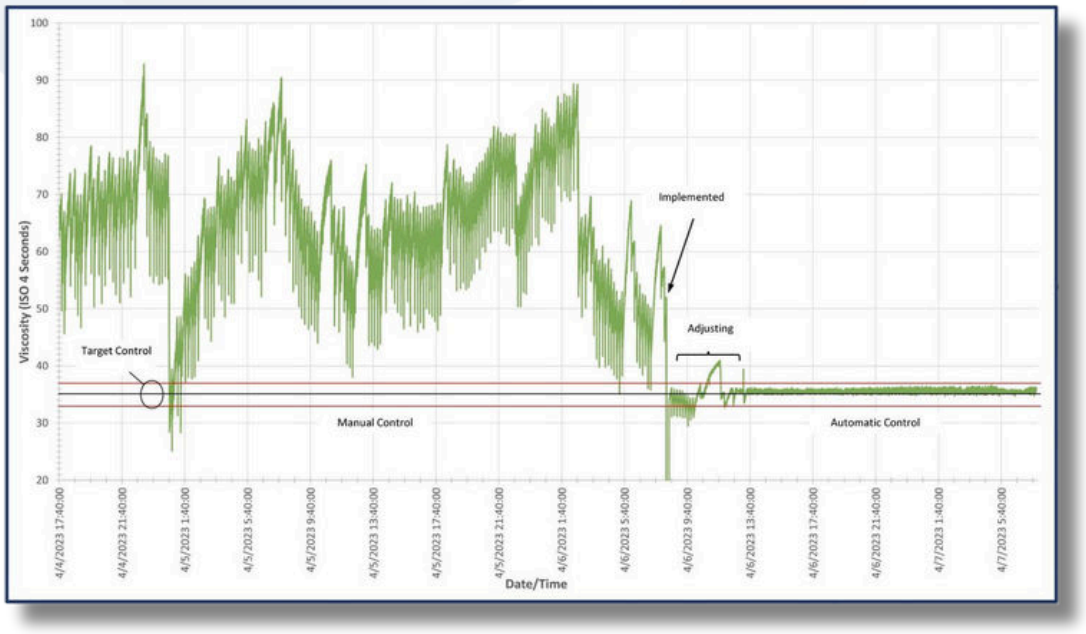
08 Decision

Your decision-making criteria, including budget, were considered before evaluating automating viscosity control. You have worked with your viscometer supplier to ensure that everything was understood up front, and this exercise was supporting your decision to either automate your viscosity control or not. If this was not understood at the beginning, and you have time to address it, do it now.

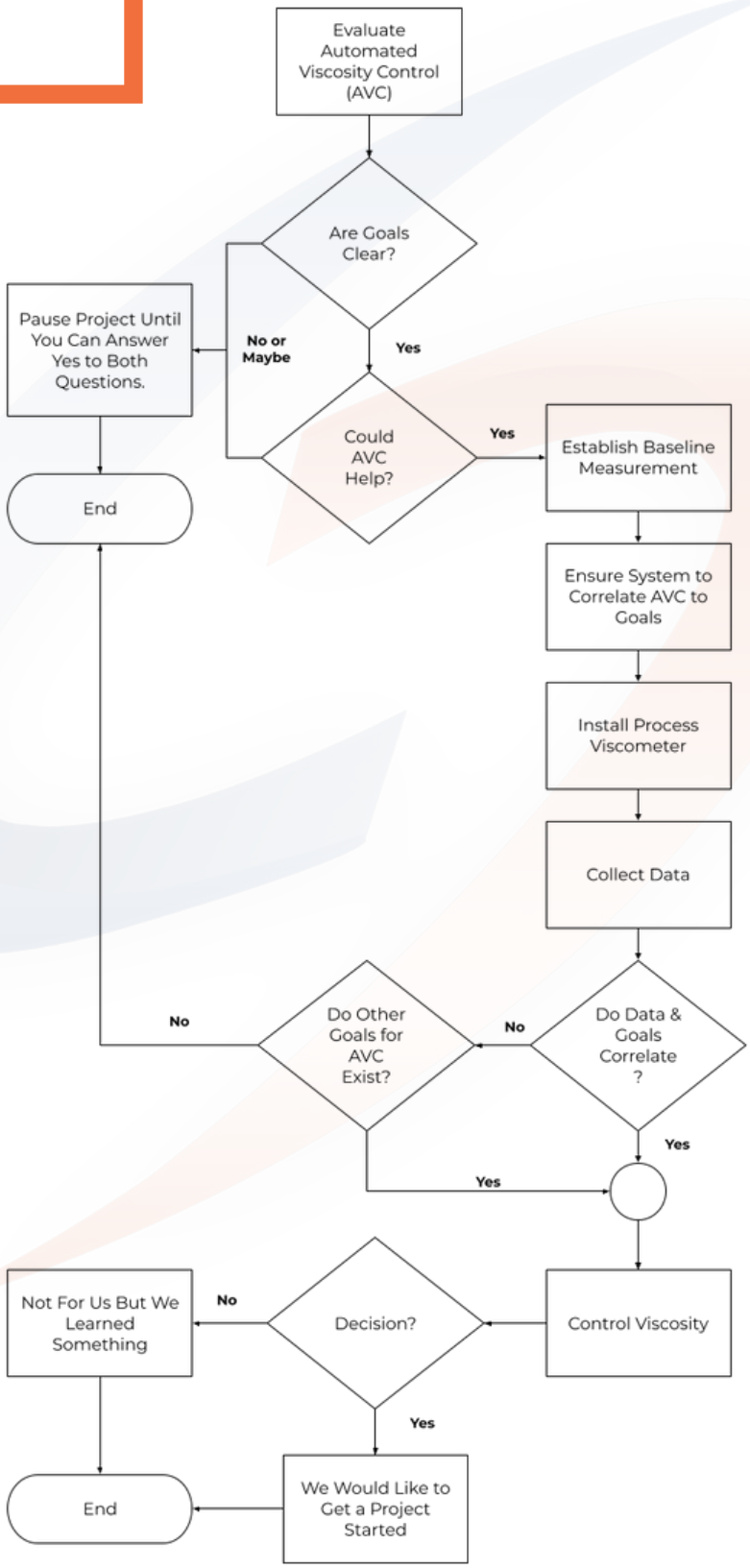
Either automating viscosity control makes sense for you or it doesn't. It's that simple.

If it doesn't, hopefully you learned a few things about your process along the way and your organization will be better for it.

If it does make sense for you, great. You have done enough work to minimize the risk of making a bad decision and should look forward to a successful improvement project.



09 Flowchart



10 Summary

01
Be clear about what you are trying to achieve and make sure that your viscosity control partner agrees that it is something they can help with.

02
Make sure you clearly understand how you are currently performing. An unrealistic baseline may lead to a bad decision.

03
Implement a solid system for being able to correlate viscosity changes with your improvement targets.

04
Install your process viscometer as close to the point-of-application as practical for the most valuable information.

05
Create a system to ensure that your team is consistently collecting usable data. Data should be the key to your decision making.

06
If you cannot draw a clear line between viscosity shifts and your improvement targets, you should consider ending the evaluation.

07
After training, calibration, and functional validation, you are ready to start controlling your viscosity with automation.

08
Either automating viscosity control makes sense for you or it doesn't. It's that simple.

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