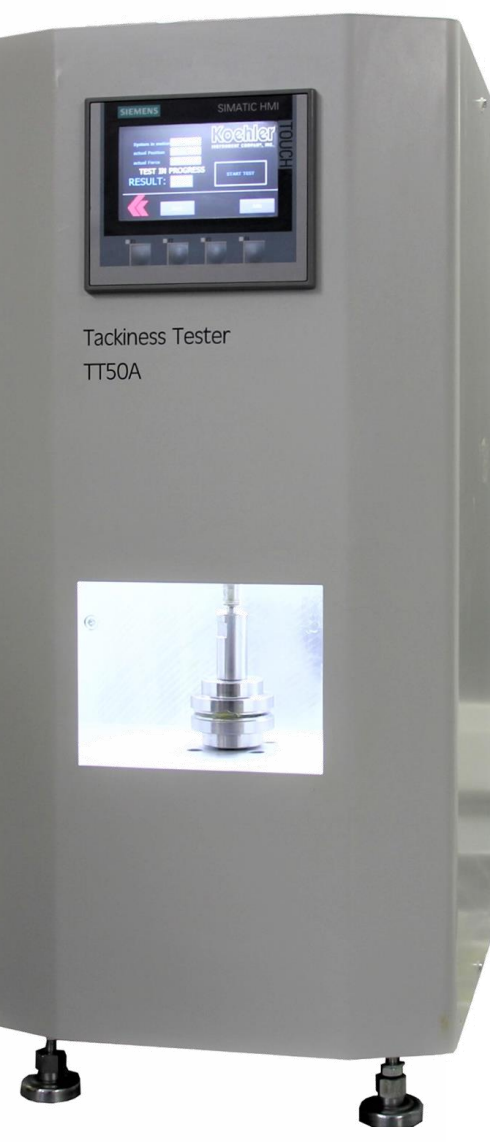


Development of a New Instrument Analytical Technique to Study the Tackiness of Lubricating Greases



Stefan Lim, Raj Shah, Vincent Colantuoni

Overview

Tackiness is a measure of the adhesive properties of a material and is the result of high weight polymers in grease. The most common method of testing for a grease's tackiness is the finger test. This test is very simple, and only provides a qualitative estimate for the tackiness.

The K95200 tests a grease's tackiness by using the same method as the finger test, but with equipment that can return a quantitative value for the tackiness.

What is the Finger Test?

The finger test is a simple test that allows the tester to determine a qualitative "measurement" for the tackiness of a grease sample. The test is conducted by placing some amount of sample between your thumb and index finger and slowly pulling them apart to see how resistant the sample is to separating. This allows the tester to determine if the grease is of low, moderate, or high tackiness. The biggest downside to this test is that "low" tackiness to one tester may be "moderate" tackiness to another, as there is no way to standardize something as subjective as this test.




Our Tackiness Tester


Our tackiness tester uses the same principles as the finger test but allows for the results to be "standardized" since the instrument conducts the test the exact same way every time. Unlike the finger test, the exact amount of force exerted to separate the grease sample is measurable. This allows for the test to be reproduced by different people in different laboratories for a more consistent and meaningful result than the traditional finger test allows.

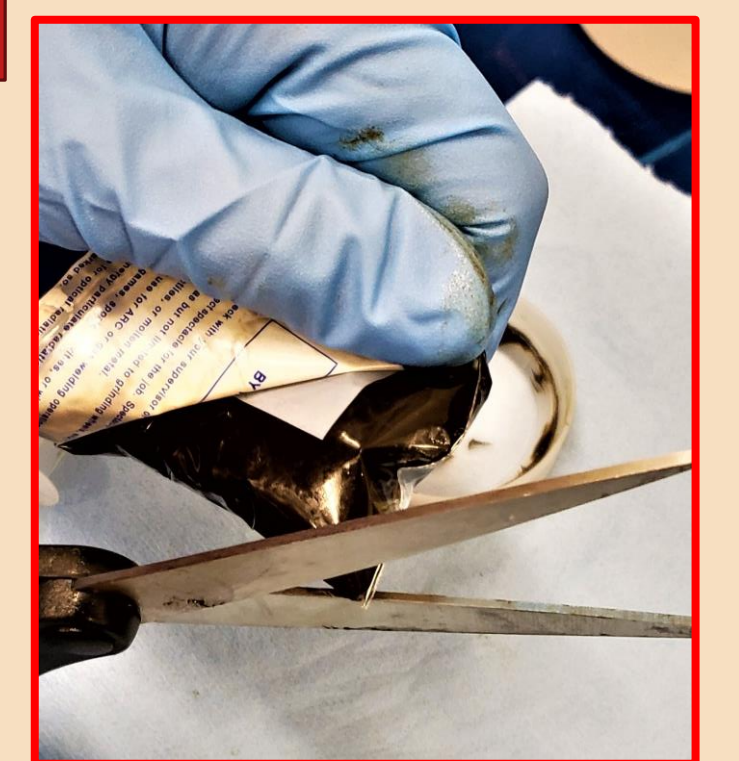
References

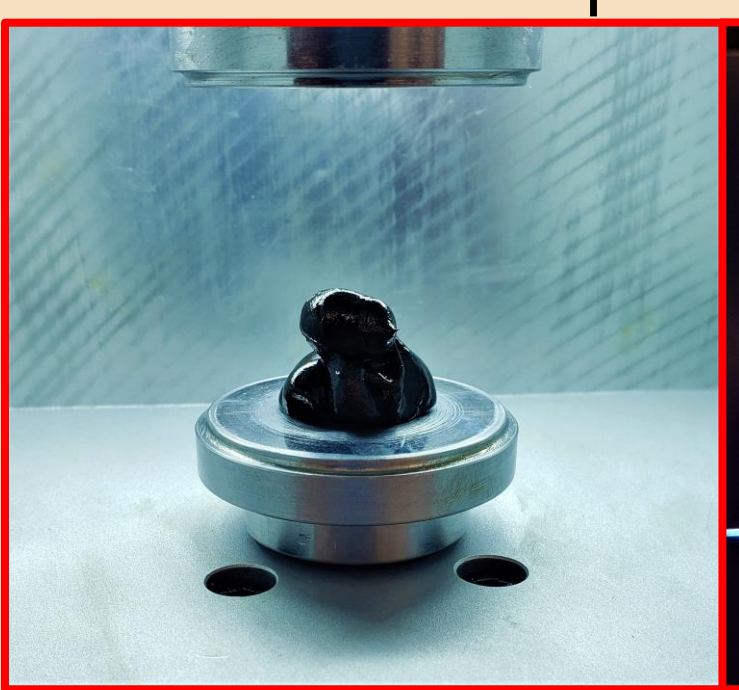
Oil and Grease Application Methods. (Technology Transfer Services)
<https://www.techtransfer.com/blog/oil-and-grease-application-methods>


How The Tackiness Tester Works

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Collect grease sample from initial container with a spatula. The collected sample will be loaded into a syringe for measuring.
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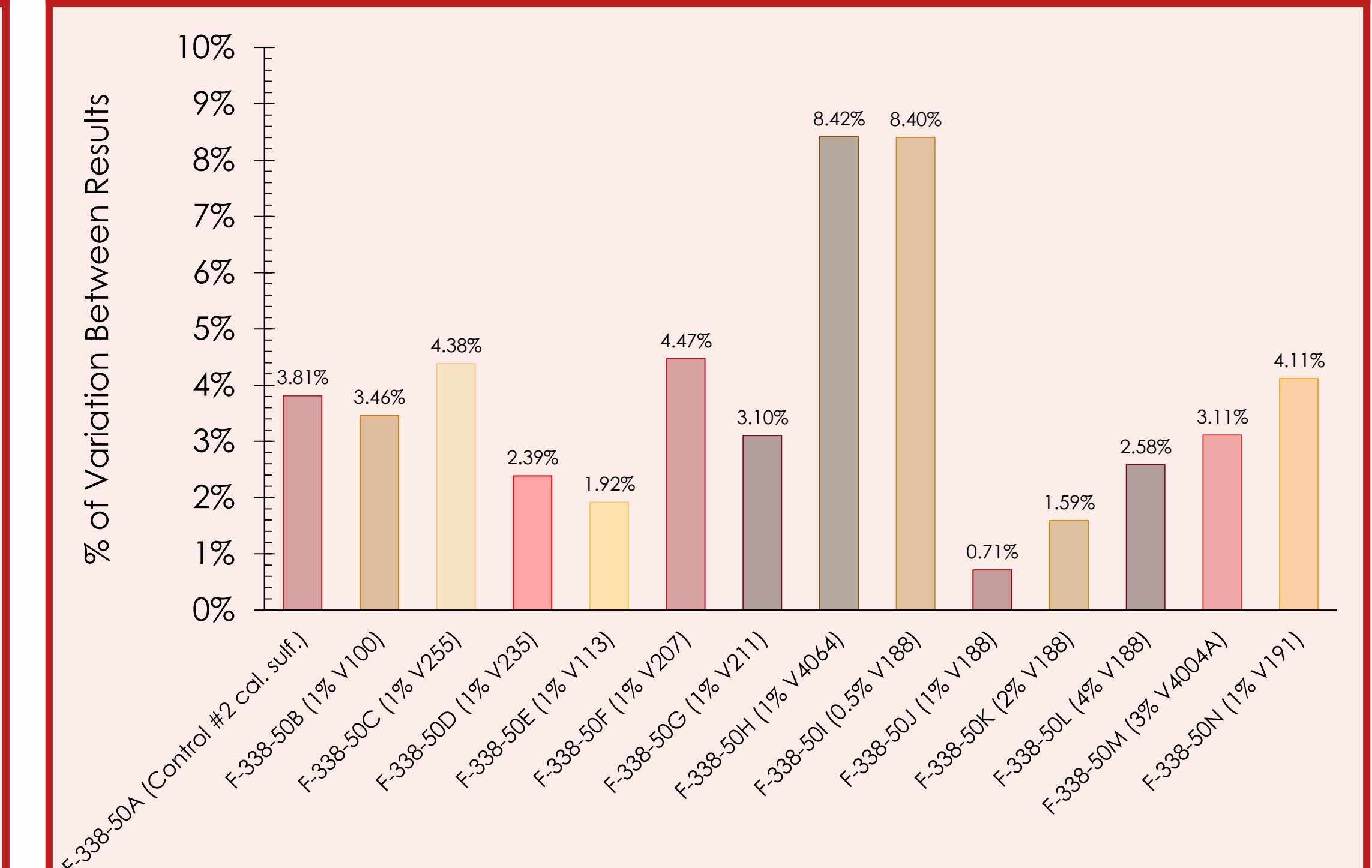
Load the sample into a small plastic bag. Use a flat edge to pack the grease sample into as small of an area as possible. This will eliminate as many air pockets as possible.
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Cut the tip off of the bag and use this opening to fill a syringe (from the back) to at least 5 mL, occasionally tapping the syringe on the lab bench to pack the grease tighter. Make sure there are as few air pockets as possible.
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Using the syringe, dispense 5 mL of grease sample onto the bottom metal plate of the Tackiness Tester. When dispensing the sample, make sure there are no air pockets present. The easiest way to do so is to dispense the sample in a centered pile. Press start to begin the test.
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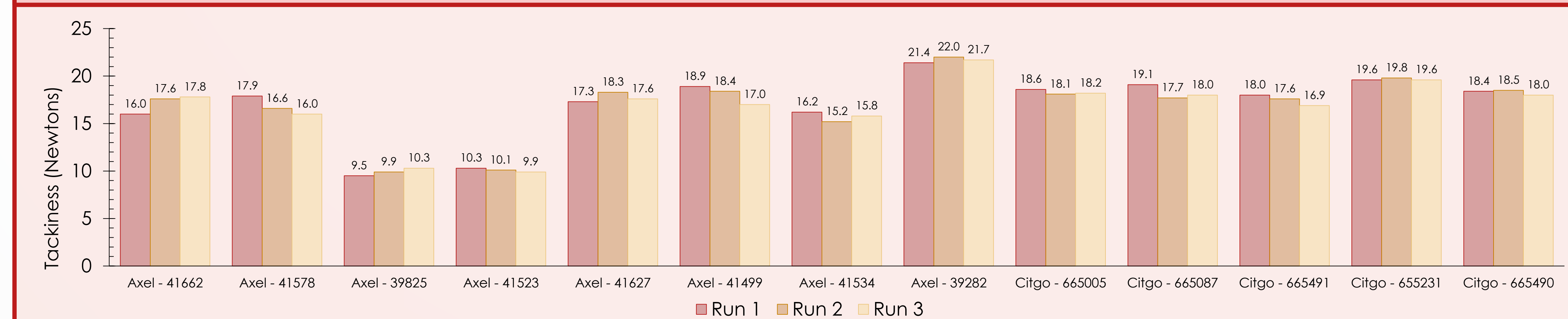
When the test finishes, the result will be displayed on screen.

Variation of Results

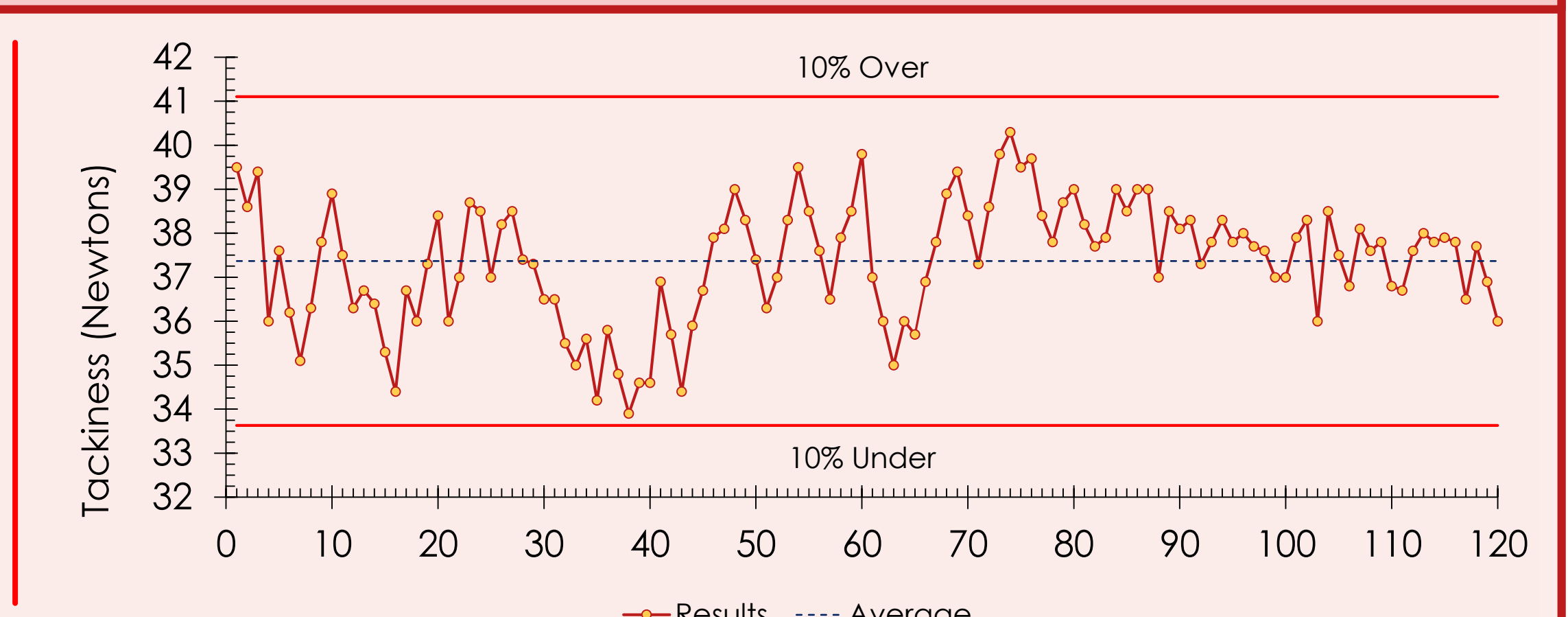


The K95200 produces highly repeatable results. The graph displayed here shows the test results of 14 different samples from Functional Products. Each sample was tested 3 times, and the range of the results was divided by the average of the results to determine the percentage of variation. In our tests, the highest percent of variation was F-338-50H, with a variation of 8.42%. All results were under the generally accepted 10% variation.

Repeatability Between Trials



The difference in measurements between trials is very low, with no sample exceeding a difference of 2 N between different runs. The graph on the left shows the results from 13 different samples from Axel and Citgo, each tested 3 times. The graph on the right shows 120 runs of a sample from Pruef-Tec, in which all 120 test runs were within 10% of the average of all results.



Conclusion

The K95200 shows highly repeatable results and is undoubtedly a better testing method than the finger test. The instrument features reliable technology that produces consistent results, making the K95200 a suitable choice grease tackiness testing.

Acknowledgements

Stefan Lim, Raj Shah, Vincent Colantuoni
 Koehler Instrument Company
 85 Corporate Drive, Holtsville NY 11742

