

## TEST BEFORE YOU LAUNCH

Nye's application testing services can provide you with data to help you qualify your design for a successful mission. Life, contamination, and compatibility testing using standard and custom test apparatus are a few of the ways Nye's engineers can assist in validating your design.





# Test Before You Launch

NYE'S APPLICATION DEVELOPMENT & VALIDATION TESTING (ADVT) LAB

## The Beginning of the ADVT Lab

Five years ago, a new concept was born within the technical organization at Nye. The core of this idea was to create a focus on developing a better understanding of the fundamentals of lubricant applications and complex electrical and mechanical systems. Many times the burden of the application testing is in the customer's hands as well as the costs. This is where the new ADVT group (Applications Development and Validation Testing) fits in. The ADVT lab is currently

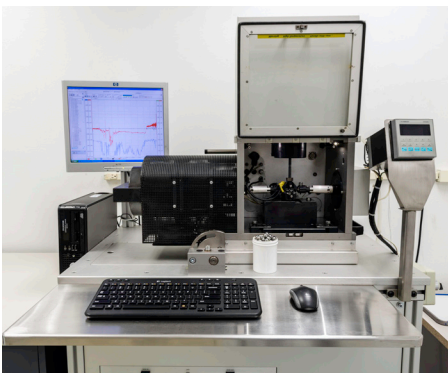
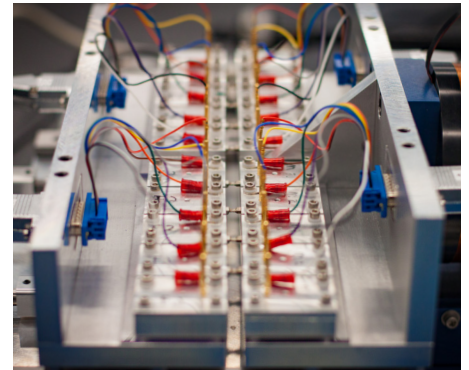
focusing on two different types of testing targeting Component Testing/Simulation and Applied Mechanics. Through a better understanding of how lubrication systems function in dynamic applications, we are able to more accurately predict performance and supply our customers with better solutions.

### FRETTING TEST RIG

#### *Vibration Testing*

Fretting wear is the result of micromotion caused by vibration and/or heat/cooling cycles. Wear and oxidation will lead to increased contact resistance and eventually failure of circuits. Nye can test your connector/lubricant to insure that they will outlast your mission life requirements.

The fretting test stand can also be modified to accept a shaft and bearing for testing. Through the use of this simulation, we are able to validate the performance of a lubricant in a real world simulated fretting environment. The endurance of the component with and without lubricant can then be determined to understand the advantages to prolonged life that the lubricant adds to the application. This means more confidence in your system and being able to insure that it will outlast your mission life requirements. Life test specs are determined by the customer.



### SRV TRIBOMETER

#### *Friction & Wear*

SRV – Schwingung (Oscillating), Reibung(Friction), Verschleiz (Wear)

Options include rotational and linear oscillatory motion, tests up to 2,000N load, 2,000rpm, and a maximum temperature of 180°C. Ball on Disc, Pin on Disc and Cylinder on Disc.

Test your component/component material and candidate lubricant for wear and coefficient of friction.

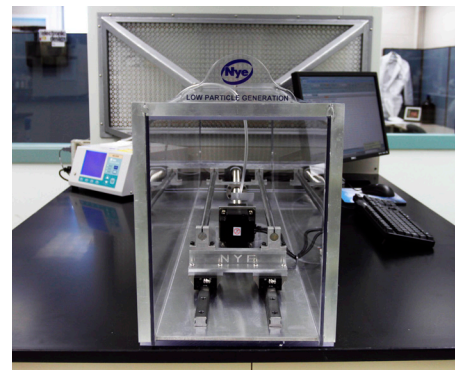
Contact a Nye Applications Engineer at +1.508.997.8917 or [ADVT@nyelubricants.com](mailto:ADVT@nyelubricants.com)

## DYNAMIC PARTICLE GENERATOR

### Contamination

The dynamic particle generating test rig is used to classify grease into ISO and Federal cleanliness levels for aerospace, cleanroom, and semiconductor applications. It utilizes an ISO 1 clean air system, precision ball screw, and particle counter to count the number of particles down to 0.1 micron produced by various greases as the test is run. The ability to run Residual Gas Analysis (RGA) on the materials shed from the lubricant is also available.

With the ability to quantify cleanliness based on particle generation, customers can now be confident that the lubricant they are using from Nye Lubricants will not contaminate their clean environment with any more particles than they are rated for and with the additional RGA analysis, they will know exactly what is being produced into their environment. Test provides ISO cleanliness levels on your lubricant.



## ASTM E595 VOLATILITY

### Contamination

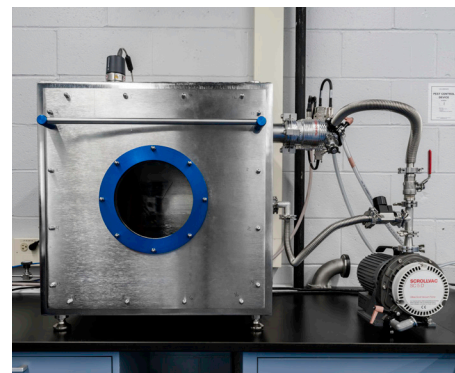
Nye outgassing test rig (per ASTM E595) is designed to screen materials for volatile contamination. This test provides percent TML (Total Mass Loss) and percent CVCM (Collected Volatile Condensable Materials) data for lubricants. We can modify the test to run at longer periods of time, different temperatures, and to collect the outgassing and analyze using Residual Gas Analysis (RGA). Through this testing, customers will get an understanding of the stability of their materials in a static vacuum environment, how much of their outgassing is condensable, as well as what is coming off their material (custom) which will all give an indication of suitability in a vacuum application environment.

## KNUDSEN VAPOR PRESSURE TEST

### Contamination

Vapor Pressure is a material's "willingness" to outgas. It is defined as the pressure exerted by a vapor in thermodynamic equilibrium with its condensed phases at a given temperature in a closed system. The higher a material's vapor pressure, the more likely it is to outgas at pressures nearing atmospheric. This is why it is essential that all materials used in semiconductor, in-vacuum, and aerospace industries possess the quality of having low vapor pressures, to be able to endure low pressure environments without outgassing and contaminating the surrounding surfaces and environment.

Through use of the High Vacuum Chamber (HVC), we are able to perform accurate testing of materials using methods like Knudsen Effusion Vapor Pressure, Langmuir Vapor Pressure, Residual Gas Analysis, and any type of custom test. This allows us to provide the exact type of data that the customer needs in making critical flight mission decisions.



## 3D DESIGN TO FABRICATION

### Custom Testing

Nye's Application Engineers will work with you to design and build test equipment to validate the lubricant for your application. By the custom modification and collaborative partnership, we can make sure you get exactly what you need to ensure confidence in your application. Nye recently designed a test rig that combined both oil separation and vapor pressure for an aerospace partner.

*Left image: Computer generated; Right image: Finished test cell*



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ISO 9001:2008  
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ISO/TS-16949:2009

