

At NES, we don't  
make additives.  
We help YOU  
develop BETTER  
additives.



Your source for  
**LUBRICANT**  
**FORMULATION**  
**TESTING**

✓ ISO9001  
CERTIFIED

✓ AS9100  
CERTIFIED

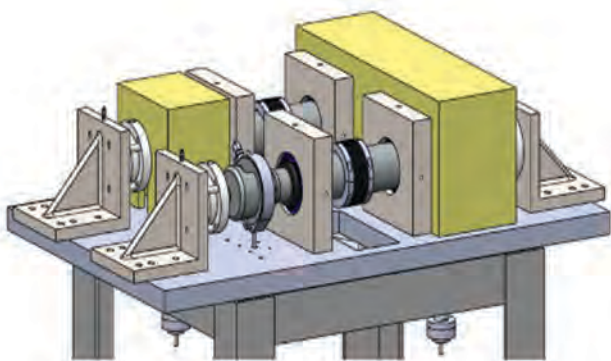
✓ NADCAP  
CHEMICAL PROCESSING

Napoleon Engineering Services (877) 870-3200

At NES, we understand the value additives and specialty formulations have on bearing life. That's why we have the largest bearing testing facility in North America dedicated to helping you develop the best lubricant solution for your customer.

We're ready to put your formulation to the test.

- ✓ Application simulation testing
- ✓ Bearing life testing
- ✓ RCF testing
- ✓ Bearing condition analysis
- ✓ Bearing efficiency testing

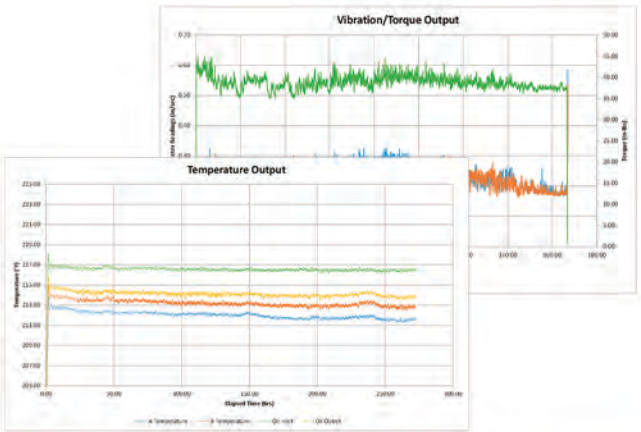


## Application Simulation Testing

NES engineers work in partnership with you to design a test that simulates the conditions under which your formulation will perform. This non-accelerated testing option provides reliable data about your formulation's effects on bearing life. Control factors include load (radial, axial, offset), speed, torque, operating temperatures, and environmental conditions. Our test rigs can also be customized to test your formulations in your customer's subassemblies.

# Bearing Life Testing

NES houses more than 50 unique test stands that can be utilized to perform accelerated life testing to help you understand your formulation's bearing life-adjustment factor. Our in-house engineers design every test around our customer's unique needs to deliver cost-effective and statistically significant data. Based on your test objectives, NES uses classical, sudden death, or maximum likelihood methodologies to perform fatigue testing using axial, radial, or combined loads. Common monitoring and control parameters include vibration, temperature, torque, speed, applied load, and lubricant flow-rate and temperature. Direct or indirect heating or cooling of the lubricant may be used for temperature control.





## Rolling Contact Fatigue Testing

The NES Five-Ball tester captures the intricate mechanics of bearing fatigue making it effective for simulation of full-scale testing of lubricant formulations without the full-scale costs.

The upper drive ball simulates the inner ring, the cup supporting the lower four balls models the outer ring and the four planetary balls replicate the rolling elements in a bearing. Five-Ball testing can be used to investigate lubricant effects on fatigue life. This modern version of the original NASA testers is designed to run at speeds up to 10,600 rpm and stress levels up to 900 ksi (6.2 GPa) on ball diameters up to 1 1/4". The NES tester controls lubricant flow, oil temperature, rotational speed, and applied load while monitoring support cup temperature and system vibration for automatic shutdown.

# North America's Largest Independent Bearing Testing and Inspection Facility



ISO9001  
CERTIFIED



AS9100  
CERTIFIED



NADCAP  
CHEMICAL PROCESSING

[www.nesbearings.com](http://www.nesbearings.com)

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## Bearing Condition Analysis

A Napoleon Engineering Services' condition analysis offers clients an understanding of how lubricant formulations affect wear characteristics within a bearing. Through this analysis, NES can determine if the problem is lubricant related and not specific to the bearing. Our microscopic capability and sophisticated dimensional inspection equipment support this assessment. The detailed reports provided by our condition analysis program have successfully helped many clients who perform their own internal tests and field assessments to further understand the performance of their lubrication formulations.



## Bearing Efficiency Testing

NES can help you determine the effects of bearing design or lubricant formulation on bearing efficiency over a wide range of test conditions. These conditions include lubricant flow rate and temperature, speed and load. The power loss is calculated using the data collected from in-line torque transducers.



# CONTACT US



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**Napoleon Engineering Services**