

QUALITY PROTECTS.

QUALITY WORKS.

LANXESS
 Energizing Chemistry

Naugalube® PANA **Phenyl- α -naphthylamine antioxidant**

Naugalube® PANA is an excellent antioxidant for synthetic fluids and mineral oils. It is particularly effective in high temperature applications, such as aviation turbine engine oils, and in the formulation of high performance industrial oils and greases. **Naugalube® PANA** is a solid antioxidant in flake form typically used at treat levels between 0.05% and 1.0%. **Naugalube® PANA** is used in the manufacture of avi-

ation turbine engine oils meeting MIL-PRF-23699 and MIL-PRF-7808 specifications.

For enhanced performance, **Naugalube® PANA** can also be used in combination with other alkylated diphenylamines, hindered phenolics and/or secondary peroxide decomposer antioxidants, as well as appropriate metal deactivators.

Applications

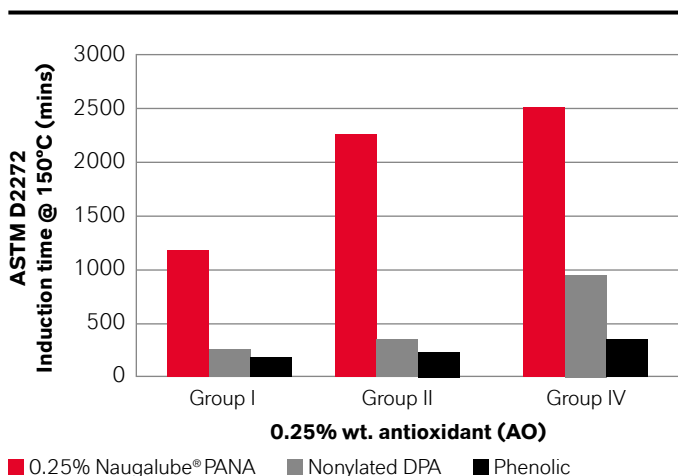
Industrial						Marine		Aviation		Automotive			Grease			
Gear oil	Turbine oil	Hydraulic oil	Heat transfer oil	Chain oil	Compressor oil	Trunk piston engine oil	System oil	Turbine oil	Hydraulic oil	Gasoline engine oil	Diesel engine oil	Auto transmission fluid (ATF)	Differential fluid	Automotive grease	Industrial grease	Aviation grease
■	■	■			■			■					■	■	■	

■ Primary recommendation ■ Alternative recommendation

X Naugalube®

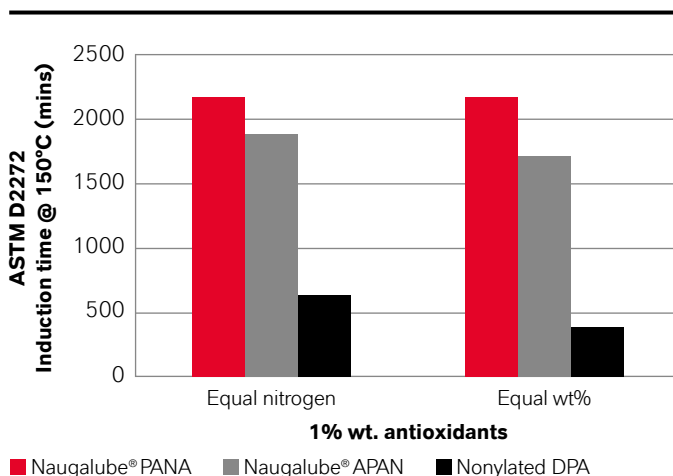
Features	Benefits
Ashless antioxidant	Can be used in a broad range of lubricant formulations
Excellent high temperature performance providing effective control against viscosity increase	Reduced oil oxidation and prolonged lubricant life
US FDA 21CFR178.3750 approved and Kosher certified	NSF HX-1 approval for use in lubricants subject to incidental food contact at a maximum level of 0.5%
High active nitrogen content	Maximizes antioxidant efficiency and provides added alkalinity

Turbine oil oxidation stability by RPVOT



RPVOT (Rotating Pressure Vessel Oxidation Test) performance testing was run at 150°C in a series of fully formulated turbine oils additized with 0.25%wt. antioxidant. Results of the testing demonstrate that Naugalube® PANA provides superior antioxidant performance to Nonylated ADPA and hindered phenolics in API Group I, Group II and Group IV base oils.

Antioxidant performance in a Group II turbine oil by RPVOT (equal nitrogen content vs. equal weight %)



RPVOT (Rotating Pressure Vessel Oxidation Test) performance testing was run at 150°C in a Group II based turbine oil at both equal nitrogen content and at equal wt%. On an equal nitrogen basis, the data shows Naugalube® PANA and APAN have superior performance over the nonylated DPA and thereby demonstrates the higher antioxidant activity of Naugalube® PANA and APAN.

Shipping information: 20 kg bags



LANXESS Solutions US Inc.
 Business Unit Lubricant Additives
 2 Armstrong Road
 Shelton, CT 06484
 USA
 Tel: +1-203-573-2000

lubricant.additives@lanxess.com
<http://lab.lanxess.com>

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

Health and Safety Information: Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the LANXESS products mentioned in this publication. For materials mentioned which are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets and product labels. Consult your LANXESS Solutions US Inc. representative or contact the Product Safety and Regulatory Affairs Department at LANXESS.

Regulatory Compliance Information: Some of the end uses of the products described in this publication must comply with applicable regulations, such as the FDA, NSF, USDA, CPSC and BfR. If you have any questions on the regulatory status of these products, contact your LANXESS Solutions US Inc. representative or Regulatory Affairs Manager at LANXESS.

Note: The information contained in this publication is current as of October, 2018. Please contact LANXESS Solutions US Inc. to determine if this publication has been revised. Naugalube®, LANXESS and the LANXESS Logo are trademarks of LANXESS Deutschland GmbH or its affiliates. All trademarks are registered in many countries in the world.