



Turbine Lubrication in the 21st Century

William R. Herguth and
Thomas M. Warne
editors



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Foreword

This publication, *Turbine Lubrication in the 21st Century*, contains papers presented at the symposium of the same name held in Seattle, Washington, on June 26, 2000. The symposium was sponsored by ASTM Committee D-2 on Petroleum Products and Lubricants and its Subcommittee D02.C0 on Turbine Oils. The symposium chairman was William R. Herguth, Herguth Laboratories, Inc., Vallejo, California. The symposium co-chairman was Thomas M. Warne, Chevron Global Lubricants, Richmond, California.

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Overview

This publication summarizes the presentations delivered at the "Symposium on Turbine Lubrication in the 21st Century," held in Seattle, Washington on June 26, 2000. The symposium was sponsored by ASTM Committee D-2 on Petroleum Products and Lubricants and its Subcommittee D02.C0 on Turbine Oils.

In the final years of the 20th Century, the lubrication requirements of turbines used for power generation increased significantly. In response, two trends emerged. One was the production of more stable lubricants; the second was the development of improved techniques for monitoring the condition and suitability for use of turbine lubricants.

For some applications, users have turned to synthetic, non-hydrocarbon fluids, such as polycarboxylic acid esters and phosphate esters. Two of the presentations describe current and future directions for some of these fluids. Phillips describes current and future applications of Fire-Resistant Turbine Lubricants, with particular emphasis on European actions to improve the safety of turbine operation. Gschwender, Snyder, Nelson, Carswell, Fultz and Saba address the special case of aircraft turbine engine lubrication and the evolution of new military specifications for Advanced High-Temperature Turbine Engine Oils.

Conventional mineral oil lubricants, produced by solvent extraction and dewaxing of heavy petroleum fractions, still constitute the largest volume of turbine lubricants. However, as we enter the 21st century, petroleum refiners have developed new processing methods; these lead to more stable hydrocarbon fluids which show great promise for the production of more stable turbine oils. One route to these hydrocarbon base fluids is through the oligomerization of olefins; the second involves the catalytic hydrocracking and isomerization of petroleum fractions. Kramer summarizes the history and current state of the Evolution of Base Oil Technology.

The use of such highly paraffinic, low heterocycle hydrocarbon base stocks can lead to steam and gas turbine lubricants with significantly improved oxidation resistance and better thermal stability. Three papers from different lubricant suppliers address some of these performance advantages these formulators have discovered using new technology base oil. Irvine discusses the Performance Advantages of Turbine Oils Formulated with Group II and Group III Basestocks; Schwager and Hardy address the Improved Response of Turbine Oils Based on Group II Hydrocracked Base Oils, while Okazaki covers the Performance Advantages of Turbine Oils Formulated with Group II Base Oils.

Regardless of the stability of lubricating fluids, successful use requires that the lubricant be regularly monitored to ensure continued suitability for use. Swift, Butler, and Dewald present new information on Turbine Oil Quality and Field Application Requirements. Kauffman and Ameye describe the use of a new instrument for oil analysis, in Antioxidant Analysis for Monitoring the Remaining Useful Life of Turbine Fluids.

This publication would not have been possible without the contributions of time, knowledge, and enthusiasm from our authors; the willingness of their employers to support this effort; the reviewers who read the papers and offered suggestions for improvement; and the ASTM personnel who provided editorial assistance and a firm hand to keep us on schedule. The co-Chairs wish to thank all who made this Symposium a success.

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