AN INTRODUCTION TO MARINE FUEL ANALYSIS

by

Nigel Draffin
M.I.Mar.E.S.T.

Revised Edition

Foreword by

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Foreword - First edition

No two fuels are exactly the same, even though they may appear to be identical. Fuel quality can change depending on the crude oil and feedstocks from which it is derived, on the type of processing it receives at the refinery and on the way it is stored, blended and delivered to ships. Until the early 1970s, and in some areas well beyond that, shipowners never worried unduly about the quality of the fuel they were buying. Since then, once the quality of the fuel started to deteriorate as a result of 'enhancements' to the refining process, bunker buyers have become all too aware of the operational, financial and legal difficulties associated with buying and using poor quality fuels.

In the 1980s, in response to increasing concern over the steady deterioration of the quality of bunker fuels, the first dedicated specialist fuel testing services began to appear. Now, these services, with testing laboratories in all the main bunkering centres, play a vital role in determining whether a fuel is suitable for burning in a diesel engine or whether it should be offloaded – or debunkered – to become subject to yet another bunker claim.

Nowadays, for many owners, it is standard practice to send a bunker sample off to a laboratory for testing before the fuel oil is used onboard, and this process is well established and understood by buyers and suppliers alike.

However, often the problems start when a testing laboratory has analysed the fuel and returned the results. What do those results mean? How should they be interpreted? What happens if the fuel is slightly outside the agreed specifications? What if other – as yet unknown or unspecified – substances show up on the analysis? How can an owner or charterer, or a supplier or trader find out what the lab results actually mean and what to do about them?

On the basis that prevention is always better than cure, everyone involved in the supply or purchasing of bunker fuels should be aware of the many parameters that are covered in marine fuel specifications and know what is reasonable to expect and possible to accept. Armed with this information, many routine problems can be avoided and costly mistakes can be averted.

Nigel Draffin's book brings home the importance of knowing the fuels you are dealing with in a bright, simple and effective way. In this book lies a wealth of information that will enable everyone from the newcomer to the 'old hand' to understand bunker fuels and what they contain, how to test each key parameter and what the test results actually mean, and what happens when problem results appear. Although never a substitute for the huge amount of detail that can be obtained from a professional analyst using a fully-equipped modern laboratory, this book certainly provides a substantial amount of information that should be welcomed and absorbed by anyone involved in any way with marine fuels.

In this book, Nigel Draffin offers numerous detailed diagrams, tables, charts and photographs which will certainly help anyone who has any doubts about what can be found in marine fuels and, once found, what to do about it. In addition, some very useful appendices provide places to go for help, lists of abbreviations and a multi-lingual glossary of the words and terms most often found in fuel test analysis reports.

I believe that this title is an important addition to the growing library of bunker-specific books published by Petrospot, and complements Nigel Draffin's previous best seller, *An Introduction to Bunkering*.

Angus Ogilvie
Technical Director
Cockett Marine Oil Ltd

June 2009

Preface - Revised edition

Fuel analysis remains one of the most powerful tools in assisting the supplier, seller and buyer to manage and handle marine fuels. Since the publication of the first edition of this book in 2009, the market has changed, with new fuel grades, new international standards and a big increase in the number of distillate fuel samples being assessed. Much of this is due to the changes in regulation of atmospheric pollution.

I was asked by Petrospot to update this book for 2015 and the introduction of the 0.10% sulphur emission control area (ECA) limit, but I chose to wait until the sixth edition of ISO 8217 was published to ensure that the information was as relevant as possible. I have tried to include all of the new fuel grades, test methods and regulatory changes but would reiterate the comment from the original preface:

Readers need to be aware that the professionals in this field do not always agree with each other. The test methods are under constant review and changes are inevitable, so the information contained inside is the best I could provide at time of publishing.

Furthermore, the definitive references to the standards and to the test methods mentioned in this book can only be found in the latest published editions of the standards concerned.

This revised edition aims to fulfil the aspirations of the first edition: to help the non-specialist to make sense of the reports received from the analysis of their fuels and to understand the practicalities and limitations of the methods we use to assess fuel quality.

Nigel Draffin

April 2018

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He also thanks Angus Ogilvie for writing the original foreword and for his help and encouragement over many years working together on training courses. Special thanks are also due to Michael Green of Intertek ShipCare and to the team at Veritas Petroleum Services (VPS) for help and encouragement with this second edition.

He gives special thanks to all those who have allowed their photographs to appear and enliven the text.

The author also extends his thanks to Llewellyn and Lesley Bankes-Hughes and their team at Petrospot for their work in editing and producing the book and to Cheryl Marshal in particular, who designed and produced the finished article.

Nigel Draffin

April 2018

About the author

Nigel Draffin has been involved in shipping for over 50 years and with the commercial bunker market for over 25 years. After joining Shell Tankers as an apprentice engineer in 1966, he rose through the ranks, serving on all classes of vessel, including VLCCs and LNG tankers. He came ashore in 1979 to join the newbuilding department of Shell International Marine. After two years of new construction in Ireland, South Korea and the Netherlands, he transferred to Shell's Research & Development unit, specialising in control systems, fuel combustion and safety systems.

In 1986, Nigel moved to the commercial department as a bunker buyer and economics analyst. In 1988, he was promoted to be Head of Operational Economics, responsible for all of the fuel purchased for the Shell fleet, the operation of the risk management policy and the speed/performance of the owned fleet.

In March 1996, he joined the staff of E.A. Gibson Shipbrokers Ltd in the bunker department, and became the manager. In 2006, this department merged with US-based broking house LQM Petroleum Services, where Nigel was senior broker and technical manager until he became a full-time consultant, lecturer and author in 2015.

Nigel is a founder member of the International Bunker Industry Association (IBIA) and has served several times on its council of management and executive board. He has also served as the association's Chairman. He is the author of IBIA's *Basic Bunkering Course* and Course Director of the Petrospot Academy, which runs industry-recognised training events, such as the *Oxford Bunker Course*.

Nigel is the author of a growing library of clearly-written, highly-respected reference books on every aspect of bunkering – including commercial issues, operations, marine engines, risk management, fuel analysis, measurement, LNG bunkering, marine lubricants and shipping – which have now sold in over 100 countries around the world.

Nigel is a member of the Institute of Marine Engineering, Science and Technology and Past Master of the Worshipful Company of Fuellers.

Llewellyn Bankes-Hughes

Managing Director, Petrospot Limited

April 2018

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