Hydrocarbon management

HM 93

A guide to manual sampling of hydrocarbon liquids

energy institute

HM 93

A GUIDE TO MANUAL SAMPLING OF HYDROCARBON LIQUIDS

First edition

January 2020

Published by
Energy Institute, London
The Energy Institute is a professional membership body incorporated by Royal Charter 2003
Registered charity number 1097899

The Energy Institute (EI) is the chartered professional membership body for the energy industry, supporting over 20 000 individuals working in or studying energy and 200 energy companies worldwide. The EI provides learning and networking opportunities to support professional development, as well as professional recognition and technical and scientific knowledge resources on energy in all its forms and applications.

The EI's purpose is to develop and disseminate knowledge, skills and good practice towards a safe, secure and sustainable energy system. In fulfilling this mission, the EI addresses the depth and breadth of the energy sector, from fuels and fuels distribution to health and safety, sustainability and the environment. It also informs policy by providing a platform for debate and scientifically-sound information on energy issues.

The EI is licensed by:
– the Engineering Council to award Chartered, Incorporated and Engineering Technician status, and
– the Society for the Environment to award Chartered Environmentalist status.

It also offers its own Chartered Energy Engineer, Chartered Petroleum Engineer, and Chartered Energy Manager titles.

A registered charity, the EI serves society with independence, professionalism and a wealth of expertise in all energy matters.

This publication has been produced as a result of work carried out within the Technical Team of the EI, funded by the EI's Technical Partners. The EI's Technical Work Programme provides industry with cost-effective, value-adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and internationally.

For further information, please visit **http://www.energyinst.org**

The EI gratefully acknowledges the financial contributions towards the scientific and technical programme from the following companies:

BP Exploration Operating Co Ltd
BP Oil UK Ltd
Centrica
Chevron North Sea Ltd
Chevron Products Company
Chrysaor
CLH
ConocoPhillips Ltd
DCC Energy
EDF Energy
ENI
E. ON UK
Equinor
ExxonMobil International Ltd
Innogy
Kuwait Petroleum International Ltd
Nexen CNOOC
Ørsted
Perenco
Phillips 66
Qatar Petroleum
Repsol Sinopec
RWE npower
Saudi Aramco
Scottish Power
SGS
Shell UK Oil Products Limited
Shell U.K. Exploration and Production Ltd
SSE
TAQA Bratani
Total E&P UK Limited
Total UK Limited
Tullow Oil
Uniper
Valero
Vattenfall
Vitol Energy
Woodside
World Fuel Services

However, it should be noted that the above organisations have not all been directly involved in the development of this publication, nor do they necessarily endorse its content.

ISBN 978 1 78725 166 3

Published by the Energy Institute

Hard copy and electronic access to EI and IP publications is available via our website, **https://publishing.energyinst.org**.
Documents can be purchased online as downloadable pdfs or on an annual subscription for single users and companies.
For more information, contact the EI Publications Team.
e: **pubs@energyinst.org**

CONTENTS

Contents continued

Page

Contents continued

Page

LIST OF FIGURES AND TABLES

Page

Figures

Contents continued

Page

Tables

FOREWORD

This publication is issued by the Energy Institute (EI) Joint Sampling Work Group (JSWG) which consists of representatives from the EI Hydrocarbon Management Committee (EI HMC), the EI Test Methods and Standardisation Committee (EI TMS) and the aviation Joint Inspection Group (JIG).

The JSWG was established to produce guidance relating to manual sampling to supplement and complement the requirements of the various sampling standards and test methods. The guidance documents produced, including this document, are subject to approval of the groups noted above which comprise technical specialists representing oil companies, equipment manufacturers, service companies, terminal and ship owners and operators.

The EI encourages international participation and when producing publications its aim is to represent the best consensus of international expertise and good practice.

The guidelines in this publication are recommended for general adoption but should be read and interpreted in conjunction with safety, environmental, weights and measures, customs and excise and other regulations in force in the particular country in which they are to be applied. Such regulatory requirements have precedence over corresponding clauses in this publication except where the requirements of the latter are more rigorous, when its use is recommended. Users should also consider any contractual constraints that may apply.

Although it is believed that adoption of the recommendations of this handbook will assist the user, the EI cannot accept any responsibility, of whatsoever kind, for damage or alleged damage arising or otherwise occurring where this document has been applied.

It is the intent of the JSWG to review this document regularly and to update it as required. Suggested revisions are invited and should be submitted to:

Technical Department
Energy Institute
61 New Cavendish Street
London
W1G 7AR

ACKNOWLEDGEMENTS

The EI wishes to record its appreciation of the work carried out by the following individuals:

Abid Dunghawala	Inspectorate
Alister Jackson	ExxonMobil
Anthony Kitson-Smith	Vitol
David Bleser	
Harry Read	
Karl Peakall	Chevron
Kevin Bower	BP
Malcolm Aylieff	Shell
Mark Harrison	Intertek
Martin Barnes	BP
Michael Green	Intertek
Naeem Javaid	Lloyd's Register
Paul Harrison	Melvcon
Paul Hebb	Phillip66
Pete Rooney	
Ravinder Sharma	Marine Cargo Experts
Richard Couling	AmSpec
Steve Allen	Shell
Steve Aylieff	SGS
Steve Robinson	Chevron
Tim Wilson	Lloyd's Register
Bruce Nicholls	13N Oil Consulting (Editorial)
Jim Crighton	Energy Institute (Editorial)
Kerry Sinclair	Energy Institute (Editorial)
Kishan Kansara	Energy Institute (Editorial)
Rattanjit Gill	Energy Institute (Editorial)
Richard Heins	Energy Institute (Editorial)

The EI would also like to thank the EI's Microbiology Committee; Shell P&T Lab Pacesetting Group for permitting the committee to adapt Section 6.8 from FPM Sampling Compressed and Liquefied Petroleum Products, Good Practice Guide; UK Sampling Gauges for providing images, and the individuals who made comments during review and ballot stages.

1 INTRODUCTION

Anyone involved in oil production, transportation, refining, storage or distribution will be aware of the importance of sampling and testing to ensure that crude oil and products meet the required specifications. In addition to quality testing for fuels etc., tests also provide the basic density (and sometimes water and sediment content) information necessary for calculation of quantities for custody transfer.

Whilst testing is often a complex business involving sophisticated analytical methods and equipment, this testing is wholly reliant on the 'quality' of the samples supplied for testing – whether they are representative, free of contamination and have maintained their integrity, see Figure 1.

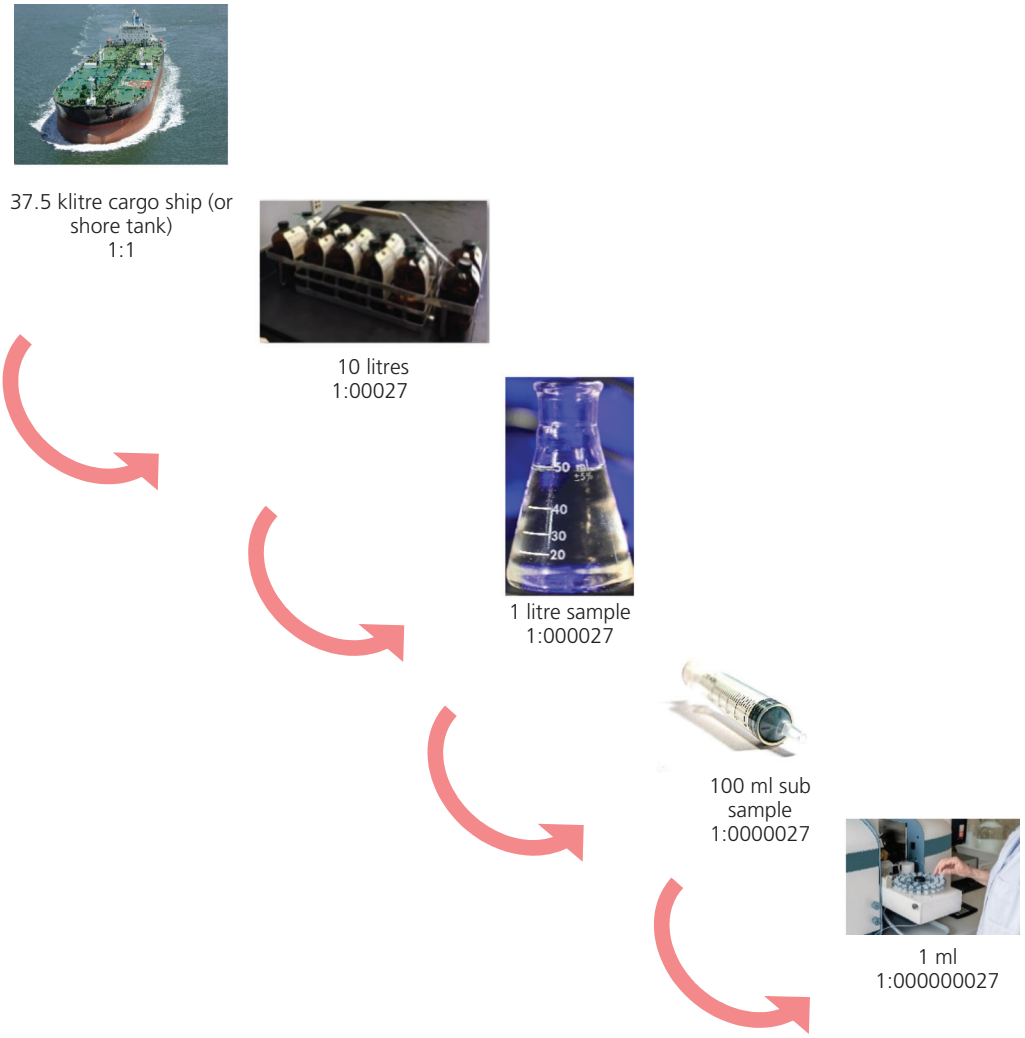

Figure 1: 100 ml subsample Ratio of samples from a 37.5 cbm oil tanker to 1 ml sample for testing