BS ISO 8310:2012

BSI Standards Publication

Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — General requirements for automatic tank thermometers on board marine carriers and floating storage

bsi.

...making excellence a habit.™

Document Sharing Hub

National foreword

This British Standard is the UK implementation of ISO 8310:2012. It supersedes BS 7575:1992 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/12, Petroleum Measurement and Sampling.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2012. Published by BSI Standards Limited 2012

ISBN 978 0 580 75083 0

ICS 75.180.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2012.

Amendments issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 8310:2012

INTERNATIONAL STANDARD

ISO 8310

Second edition
2012-11-01

Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — General requirements for automatic tank thermometers on board marine carriers and floating storage

Hydrocarbures réfrigérés et combustibles gazeux liquéfiés à base non pétrolière — Exigences générales pour les thermomètres de réservoir automatiques à bord des transporteurs de cargaison en mer et des stocks flottants

Reference number
ISO 8310:2012(E)

Documents
Document Sharing Hub

© ISO 2012

Full document details: BS ISO 8310:2012

COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

© ISO 2012 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO 8310:2012

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Safety precautions **2**
4.1 General 2
4.2 Equipment precautions 3
5 Design requirements **3**
5.1 General 3
5.2 Temperature sensors 3
5.3 Indicating device 4
5.4 Installation 4
5.5 Provisions for routine maintenance and verification 4
5.6 Provision against sudden malfunctions 4
5.7 Dynamic response 4
5.8 Measurable range 4
5.9 Data processing and reporting 4
5.10 Compensation for variation of cargo temperatures 5
5.11 Sealing, security and unsealing 5
5.12 Redundancy 5
5.13 Data communication 5
6 Calibration and accuracy verification **5**
6.1 General 5
6.2 Calibration reference 6
6.3 Calibration and accuracy verification at factory 6
6.4 Calibration and accuracy verification after installation 6
6.5 Periodic accuracy verification 9
7 Accuracy requirement **9**
7.1 Overall error 9
7.2 Resolution 10
8 ATT calibration records **10**
Annex A (informative) **Information on platinum resistance thermometers** **11**
Bibliography **12**

© ISO 2012 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 8310:2012

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8310 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 5, *Measurement of refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 8310:1991), which has been technically revised.

© ISO 2012 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 8310:2012

Introduction

Large quantities of liquefied natural gas (LNG), liquefied petroleum gas (LPG) and other liquefied gases are usually transported by marine carriers dedicated for these applications and traded based on static measurement on board by automatic tank measurement. Such an automatic tank measurement may be a part of the custody transfer measurement system (CTMS) which involves determination of liquid/vapour interface, i.e. liquid level, average temperatures of liquid and vapour, and vapour pressure. The volumetric quantity of the liquid and gas is then computed with the tank capacity table based on which the delivered quantity in terms of energy content or mass is calculated.

In most cases, shore tank measurement is not used due to the active and dynamic conditions of the shore tank operations. In the absence of other means of acceptable measurement, custody transfer measurement usually takes place on board the carrier or floating production storage offshore (FPSO) and floating storage offshore (FSO). Liquid cargo density is very sensitive to temperature; therefore, obtaining accurate temperature readings is extremely important. For example, a change of 0,2 °C for liquid methane cargo results in a change in density of approximately 0,07 %.

This International Standard also discusses use of automatic tank thermometers on board marine vessels for other volatile, non-petroleum liquids in fully refrigerated conditions. Many of these non-petroleum liquids, such as di-methyl ether (DME) are measured in a similar manner to that used for fully refrigerated LPGs.

Values of temperature in this International Standard are in terms of the International Temperature Scale of 1990, ITS-90. Temperatures in degrees Celsius are denoted by the symbol *t*.

© ISO 2012 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 8310:2012

Documents
Document Sharing Hub