



**International  
Standard**

**ISO 4678**

**Ships and marine technology —  
Noise measurement method for  
HVAC system in accommodation  
spaces**

*Navires et technologie maritime — Méthode pour le mesurage du  
bruit du système CVCA dans les locaux*

**First edition  
2024-01**

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

ISO 4678:2024

<https://standards.iteh.ai/catalog/standards/iso/c9a27062-4e36-4285-87ac-aabc603d3779/iso-4678-2024>

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

ISO 4678:2024

<https://standards.iteh.ai/catalog/standards/iso/c9a27062-4e36-4285-87ac-aabc603d3779/iso-4678-2024>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b>	<b>iv</b>
<b>Introduction</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 Instrumentation</b>	<b>2</b>
4.1 Microphone with sound level meter or other microphone amplifier	2
4.2 Microphone cable	2
4.3 Frequency analyser	2
4.4 Nose cone and windshield	3
4.5 Sound level recorder or other data sampling devices	3
4.6 Calibration of instruments	3
<b>5 General requirements</b>	<b>3</b>
<b>6 Measurement procedure</b>	<b>3</b>
6.1 Outlet noise measurement	3
6.2 Background noise measurement and outlet noise correction	4
6.3 Reverberation time measurement	5
6.4 Result processing	5
6.4.1 Exhaust outlet noise level	5
6.4.2 Calculation of the cabin sound absorption	6
6.4.3 Determination of the vent noise levels	6
6.5 Measurement uncertainties	7
<b>7 Measurement report</b>	<b>7</b>
7.1 Measurement company and personnel	7
7.2 Ship particulars	7
7.3 HVAC particulars	7
7.4 Measuring instruments	8
7.5 Measuring conditions	8
7.6 Measurement data	8
<b>Bibliography</b>	<b>9</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

ISO 4678:2024

<https://standards.iteh.ai/catalog/standards/iso/c9a27062-4e36-4285-87ac-aabc603d3779/iso-4678-2024>

## Introduction

Heating, ventilation and air conditioning (HVAC) is one of the most serious noise sources, especially for ship accommodation spaces that are far from the machinery spaces. This noise source affects the habitability comfort of crews and passengers on a ship. Although some standards exist for measuring noise on board vessels, for example ISO 2923, no special attention has been paid to measure noise arising from the HVAC. Other standards such as ISO 3740 are more accurate for quantifying measurement of a noise source. However, the methods specified in other standards require more measurement instruments, are more time-consuming than the method presented in this document and are difficult to use in the noise measurement of HVAC system onboard ships, which has many outlets distributed in hundreds of cabins.

This document specifies a method of noise measurement of HVAC systems in ship accommodation spaces by placing three microphones around the vent outlets to reduce airflow interference and space inhomogeneity, and by correcting the noise result by measuring the reverberation time of the cabin. The noise measurement method for the HVAC system is a compromise, which is more precise, but less laborious, compared to the previous methods.

The measurement should be performed for ship accommodation spaces, where noise exceeds the required limits according to existing regulations. The measurement and analysis results could be used to detect the causes of the higher noise level of the HVAC system, further enabling objective measures to be taken to mitigate these causes.

**iTeh Standards**  
(<https://standards.itih.ai>)  
**Document Preview**

[ISO 4678:2024](https://standards.itih.ai/catalog/standards/iso/c9a27062-4e36-4285-87ac-aabc603d3779/iso-4678-2024)

<https://standards.itih.ai/catalog/standards/iso/c9a27062-4e36-4285-87ac-aabc603d3779/iso-4678-2024>

