
**Acoustics — Acoustic quality of open
office spaces**

Acoustique — Qualité acoustique des espaces de bureaux ouverts

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

[ISO 22955:2021](https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021)

<https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021>



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

[ISO 22955:2021](https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021)

<https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

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
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
3.1 General terms.....	2
3.2 Terms related to the workspace layout.....	2
3.3 Terms related to acoustics.....	3
3.4 Acoustic descriptors and related terms.....	4
4 General approach	6
4.1 Introduction to the general approach.....	6
4.2 Methodology.....	6
5 Typology, acoustic challenges and requirements	7
5.1 General.....	7
5.2 Space type 1: activity not known yet – vacant floor plate.....	7
5.2.1 Description.....	7
5.2.2 Noise environment characterising this type of space.....	7
5.2.3 Acoustic challenges.....	7
5.3 Space type 2: activity mainly focusing on outside of the room communication (by telephone/audio/video).....	8
5.3.1 Description of the activity.....	8
5.3.2 Noise environment characterising this type of space.....	8
5.3.3 Acoustic challenges.....	8
5.3.4 Acoustic indicators and values.....	8
5.4 Space type 3: activity mainly based on collaboration between people at nearest workstation.....	9
5.4.1 Description of activity.....	9
5.4.2 Noise environment characterising this type of space.....	9
5.4.3 Acoustic challenges.....	9
5.4.4 Acoustic indicators and values.....	10
5.5 Space type 4: activity based on a small amount of collaborative work.....	10
5.5.1 Description of activity.....	10
5.5.2 Noise environment characterising this type of space.....	10
5.5.3 Acoustic challenges.....	11
5.5.4 Acoustic indicators and values.....	11
5.6 Space type 5: activity that can involve receiving public.....	11
5.6.1 Description of activity.....	11
5.6.2 Noise environment characterising this type of space.....	12
5.6.3 Acoustic challenges.....	12
5.6.4 Acoustic indicators and values.....	12
5.7 Space type 6: combining activities within the same space.....	12
5.7.1 Description of activities.....	12
5.7.2 Source/receiver.....	13
5.7.3 Noise environment characterizing this type of space.....	13
5.7.4 Acoustic challenges.....	13
5.7.5 Acoustic indicators and values.....	13
6 Workspace layout and room acoustics	14
6.1 Dimensions and geometry of open-plan space.....	14
6.2 Position of support spaces with respect to open-plan space.....	15
6.3 Distance between workstations in open-plan spaces.....	15
6.4 Principles of room acoustic treatment.....	15
6.4.1 General.....	15

6.4.2	Ceiling treatment.....	16
6.4.3	Wall treatment.....	16
6.4.4	Floor treatment.....	16
6.5	Effect of type of furniture.....	16
6.5.1	Principle.....	16
6.5.2	Screen fixed to worktop (low divider), free-standing screens and suspended screens.....	17
6.6	Accessibility and special needs.....	18
Annex A (normative) Detailed definition and measurement method of the $D_{A,S}$ parameter		19
Annex B (normative) Flow chart summarising the approach		22
Annex C (informative) Collective use of open-plan spaces: etiquette		26
Annex D (informative) Example of a user survey on open-plan office acoustics		27
Annex E (informative) Minimum requirements for measuring workstation noise level, $L_{Aeq,T}$ during an activity		35
Annex F (informative) Sound masking systems		36
Annex G (informative) Acoustic indicators and values when the activity isn't known yet		37
Bibliography		38

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

[ISO 22955:2021](https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021)

<https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021>

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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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.

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

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.

ISO 22955:2021

<https://standards.iteh.ai/catalog/standards/iso/23b6bd31-748f-48e0-80d6-e0272a3f19fc/iso-22955-2021>

Introduction

Open-plan offices are increasingly common. They can cause apprehension from users due to noise and the difficulty of performing two theoretically contradictory activities in terms of acoustics: oral communication and focused individual work. In this type of space, disturbance caused by speech can result in tension between people who want to concentrate and people who are required to talk to perform their activity.

This document is concerned with the acoustics of open-plan spaces and, more specifically, cognitive effects of noise, i.e. acoustic comfort and noise disturbance linked to the obligations of the activity.

It is intended for stakeholders working in the planning, design, construction or layout of open-plan offices. Its aim is to help them provide users with a good level of acoustic comfort. It is meant as a basis for discussion and dialogue between the stakeholders involved in creating office spaces. In particular, it is intended for project owners to fine-tune the drafting of the acoustic specifications and help project management companies decide upon their objectives and the resources linked to the architecture and layout of open-plan offices.

The aim of this document is to offer principles, descriptors and measurement methods to characterise acoustics, which are easy to use and correspond to the perception of the acoustical environment by the occupants of the spaces.

Studies^[3] to ^[5] have shown that noises that are uncontrollable, intelligible and with no link to the activity of an individual are the most disturbing and shall be minimised. They most often come from adjacent workstations, recreational areas, shared areas or neighbouring offices. For this reason, this document is focused on containing speech propagation.

The approach chosen for open-plan spaces is to limit disturbance between adjacent workstations but also to optimize comfort for short-distance conversations. The underlying idea is that a high level of intelligibility in the area of communication (near to the workstation) results in less disturbance at more distant workstations. This document addresses the issues of noise comfort, in particular via the concepts of "discretion" and "distraction reduction".

This document provides an opportunity to reflect further, by including an analysis of activities that involve more or less collaboration on the one hand, and by addressing everything that constitutes an open-plan space on the other, in particular in terms of surface treatments and additional office layout such as furniture, acoustic screens or low dividers, etc.

This document establishes a link between acoustic quality and the acoustic performance to be achieved in an open office. The principles and descriptors apply to usual situations in terms of acoustic disturbance, privacy and discretion. They also include the working practices inherent to these spaces and the expectations of the organisations that use them regarding productivity and the well-being of employees.

This document reflects the technological and economic context of office construction in relation to both operations in unfurnished offices and resulting layout practices. In addition, this document reflects the expectations of the end users, based on the experience from the members of the commission and publications available at the date the text was drafted.