

David M. Sykes · Gregory C. Tocci
William J. Cavanaugh *Editors*

Sound & Vibration 2.0

Design Guidelines for Health Care
Facilities (2010)

Sound & Vibration 2.0

David M. Sykes • Gregory C. Tocci • William J. Cavanaugh
Editors

Sound & Vibration 2.0

Design Guidelines for Health Care Facilities (2010)

Editors

David M. Sykes
Acoustics Research Council
Boston, Massachusetts
USA

Gregory C. Tocci
Acoustics Research Council
Boston, Massachusetts
USA

William J. Cavanaugh
Acoustics Research Council
Boston, Massachusetts
USA

ISBN 978-1-4614-4986-7 ISBN 978-1-4614-4987-4 (eBook)
DOI 10.1007/978-1-4614-4987-4
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2012946034

© ARC 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

NOTICE OF COPYRIGHT

Terms & Conditions of Use:

By downloading this document, you have entered into a binding contract for which civil and criminal penalties exist to protect against copyright infringement in all countries. Under no circumstances may the electronic final you are licensing be copied, stored, placed on a network or any sort, or transferred. And under no circumstances may this document be resold in any form.

This document is a **single-user, secure and non-revisable Adobe Acrobat PDF file**. You are purchasing a **single-user license** to store this file on your personal computer.

You may print and retain ONE printed copy of the PDF file. The printed copy may not be stored, reproduced, transferred or resold by any means. The printed copy is also fully protected by national and international copyright laws and may not be photocopied in any form.

This document is the copyright of the Acoustical Working Group, Acoustics Research Council, LLC (ARC), comprised of members of leading professional societies in acoustics, noise control engineering and acoustical consulting.

Questions: dsykes@healthcareacoustics.org, co-chair, Cambridge, MA USA

SOUND & VIBRATION

Design Guidelines for Health Care Facilities

January 1, 2010

Public Draft 2.0, 8.9.11 – including guidelines for NICUs

Prepared for the Facility Guidelines Institute by: **The Acoustical Working Group, Acoustics Research Council, LLC (ARC), comprised of members of leading professional societies in acoustics, noise control engineering and acoustical consulting**

Editor: David M. Sykes

Editor: Gregory C. Tocci, P.E., FASA, INCE Bd. Cert.

Editor: William J. Cavanaugh, FASA, F/INCE Bd. Cert.



This document is a Reference Standard for acoustics by:

- 2010 FGI Guidelines for Design and Construction of Health Care Facilities
- Green Guide for Health Care v2.2 (Jan 2007) – two acoustic credits
- LEED for Healthcare IEQc2 – two acoustic credits (2011)

NOTE TO READERS:

This document is a reference document for architectural acoustics cited by the following organizations:

- FGI Guidelines for Design and Construction of Health Care Facilities, 2010 ed.
- Green Guide for Healthcare v2.2 (January 2007) which includes 2 new credits for acoustics
- LEED for Healthcare (in draft) which includes 2 new credits for acoustics

While the technical information is consistently referred to by these organizations, there are variations in how these criteria are used to achieve credits or compliance.

Notes:

1. Error in the 2010 Guidelines:

A new ASTM standard was erroneously referred to in the 2010 FGI Guidelines section 1.1-5.5 Referenced Codes and Standards (ASTM E2638-08). This error has been corrected in the errata sheet to the 2010 edition. This new ASTM standard appeared too late in the development process for the 2010 FGI Guidelines to be included in the public review process that preceded publication. Therefore, the contents of ASTM E2638-08 were not included in Guidelines *Table 1.5-4: Design Criteria for Speech Privacy*.

2. Corresponding tables in the Guidelines: In the FGI 2010 Guidelines, seven tables from this document are labeled as follows:

- **2010 Guidelines Table A1.2-1:** "Categorization of Health Care Facility Sites by Exterior Ambient Sound"

See **page 23** in this document, [Table 1.3-1](#): "Categorization of Hospital Sites by Exterior Ambient Sound."

- **2010 Guidelines Table 1.2-1:** "Design Room Sound Absorption Coefficients"

See **page 35** in this document, [Table 2.3-1](#): "Recommended design room sound absorption coefficients."

- **2010 Guidelines Table 1.2-2:** "Minimum-Maximum Design Criteria for Noise in Interior Spaces"

See **page 43** in this document, [Table 3.3-1](#): "Recommended criteria for noise in Interior Spaces."

- **2010 Guidelines Table 1.2-3:** "Design Criteria for Minimum Sound Isolation Performance Between Enclosed Rooms"

See **page 51** in this document, [Table 4.3-1](#): "Recommended Sound Isolation Performance Between Enclosed Rooms."

- **2010 Guidelines table 1.2-4:** "Design Criteria for Speech Privacy for Enclosed Rooms and Open Plan Spaces"

See **page 54** in this document, [Table 4.4-1](#): "Speech Privacy for Enclosed Rooms" and [Table 4-4](#): "Speech Privacy Goals for Open-Plan Spaces."

- **2010 Guidelines table A2.1-a:** "Sound Transmission Loss or Attenuation Through Horizontal and Vertical Barriers in NICUs"

See **page 56** in this document, "Adapted from Evans JB, Philbin MK, Facility and operations planning for quiet hospital nurseries."

- **2010 Guidelines table 1.2-5:** "Maximum Limits on Footfall Vibration in Health Care Facilities"

See **page 67** in this document, [Table 6.3.2-1](#): "Recommended Limits on Footfall Vibration in Hospitals."