



NSAI
Standards

Irish Standard
I.S. EN 62366:2009

Medical devices - Application of usability engineering to medical devices (IEC 62366:2007 (EQV))

I.S. EN 62366:2009

Incorporating amendments/corrigenda issued since publication:

<i>This document replaces:</i>	<i>This document is based on:</i> EN 62366:200X	<i>Published:</i>	
This document was published under the authority of the NSAI and comes into effect on: 24 February, 2009		ICS number: 11.040	
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie	Price Code: AG
Údarás um Chaighdeáin Náisiúnta na hÉireann			

ICS 11.040

English version

**Medical devices -
Application of usability engineering to medical devices
(IEC 62366:2007)**

Dispositifs médicaux -
Application de l'ingénierie de l'aptitude
à l'utilisation aux dispositifs médicaux
(CEI 62366:2007)

Medizinprodukte -
Anwendung der Gebrauchstauglichkeit
auf Medizinprodukte
(IEC 62366:2007)

This European Standard was approved by CENELEC on 2007-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

I.S. EN 62366:2009

EN 62366:2008

- 2 -

Foreword

The text of document 62A/574/FDIS, future edition 1 of IEC 62366, prepared by a joint working group of subcommittee 62A: Common aspects of electrical medical equipment used in medical practice, of IEC TC 62, Electrical equipment in medical practice and ISO/TC 210, Quality management and corresponding general aspects for medical devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62366 on 2007-12-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2008-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-12-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives MDD (93/42/EEC) and IVD (98/79/EC). See Annex ZZ.

In this standard, the following print types are used:

- Requirements and definitions: roman type.
- *Means to assess compliance: italic type.*
- Informative material appearing outside of tables, such as notes, examples and references: in smaller type. Normative text of tables is also in a smaller type
- TERMS DEFINED IN CLAUSE 3 OR AS NOTED: SMALL CAPITALS.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62366:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60601-1	NOTE Harmonized as EN 60601-1:2006 (not modified).
IEC 60601-1-8	NOTE Harmonized as EN 60601-1-8:2007 (not modified).
ISO 9000	NOTE Harmonized as EN ISO 9000:2005 (not modified).
ISO 9001	NOTE Harmonized as EN ISO 9001:2000 (not modified).
ISO 9241-11	NOTE Harmonized as EN ISO 9241-11:1998 (not modified).
ISO 13485	NOTE Harmonized as EN ISO 13485:2003 (not modified).



INTERNATIONAL STANDARD

NORME INTERNATIONALE

Medical devices – Application of usability engineering to medical devices

Dispositifs médicaux – Application de l'ingénierie de l'aptitude à l'utilisation aux dispositifs médicaux



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2007 IEC, Geneva, Switzerland

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 IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00



INTERNATIONAL STANDARD

NORME INTERNATIONALE

Medical devices – Application of usability engineering to medical devices

Dispositifs médicaux – Application de l'ingénierie de l'aptitude à l'utilisation aux dispositifs médicaux

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XD

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 * Scope	7
2 Normative references	7
3 Terms and definitions	7
4 * Principles	11
4.1 General requirements.....	11
4.1.1 * USABILITY ENGINEERING PROCESS	11
4.1.2 RESIDUAL RISK.....	11
4.1.3 Information for SAFETY	12
4.2 * USABILITY ENGINEERING FILE	12
4.3 Scaling of the USABILITY ENGINEERING effort.....	12
5 * USABILITY ENGINEERING PROCESS.....	12
5.1 * Application specification.....	12
5.2 * Frequently used functions	13
5.3 Identification of HAZARDS and HAZARDOUS SITUATIONS related to USABILITY	13
5.3.1 Identification of characteristics related to SAFETY	13
5.3.2 * Identification of known or foreseeable HAZARDS and HAZARDOUS SITUATIONS.....	14
5.4 PRIMARY OPERATING FUNCTIONS	14
5.5 * USABILITY SPECIFICATION	15
5.6 USABILITY VALIDATION plan.....	15
5.7 * USER INTERFACE design and implementation	16
5.8 * USABILITY VERIFICATION	16
5.9 * USABILITY VALIDATION.....	17
6 * ACCOMPANYING DOCUMENT	17
7 * Training and materials for training.....	18
Annex A (informative) General guidance and rationale.....	19
Annex B (informative) Categories of USER action.....	31
Annex C (informative) Examples of USE ERRORS, ABNORMAL USE and possible causes.....	33
Annex D (informative) Guidance on the USABILITY ENGINEERING PROCESS.....	36
ANNEX E (informative) Questions that can be used to identify MEDICAL DEVICE characteristics associated with USABILITY that could impact on SAFETY.....	60
ANNEX F (informative) Examples of possible USABILITY related HAZARDOUS SITUATIONS.....	64
Annex G (informative) USABILITY goals: Illustrative example for a home parenteral infusion pump	67
ANNEX H (informative) Sample USABILITY SPECIFICATION and its inputs	77
Annex I (informative) Recommended reading list	87
Annex J (informative) Reference to the essential principles	95
Bibliography.....	96
Index of defined terms	98

Figure A.1 – A comparison of the RISK MANAGEMENT PROCESS (ISO 14971:2007) and the USABILITY ENGINEERING PROCESS (IEC 62366)	24
Figure B.1 – Categories of foreseeable USER action	32
Figure D.1 – A USER INTERFACE design cycle	39
Figure D.2 – Bubble diagram of the conceptual model of a physiological monitor	52
Figure F.1 – Pictorial representation of the relationship of HAZARD, sequence of events, HAZARDOUS SITUATION and HARM	65
Table D.1 – Sample of design flaws and associated USE ERRORS	37
Table D.2 – Mapping of Figure D.1 to the subclauses of this International Standard	39
Table D.3 – Examples of USER INTERFACE requirements	42
Table D.4 – Typical deliverables	47
Table D.5 – Examples of objective USABILITY goals	50
Table D.6 – Examples of subjective USABILITY goals.....	50
Table D.7 – Examples of USER INTERFACE modelling techniques	53
Table D.8 – Characteristics of a typical USABILITY testing effort	53
Table F.1 – Glossary of relevant RISK MANAGEMENT terms	64
Table F.2 – Examples of HARM due to USABILITY related HAZARDS.....	65
Table G.1 – Power on/off	70
Table G.2 – Program pump.....	70
Table G.3 – Start/stop infusion.....	71
Table G.4 – Monitor infusion status.....	72
Table G.5 – Install and change set.....	72
Table G.6 – Priming	73
Table G.7 – Respond to and inactivate ALARM SIGNALS ^a	73
Table G.8 – Lockouts	74
Table G.9 – Power management.....	74
Table G.10 – Preventative and routine maintenance	75
Table G.11 – Basic operation.....	76
Table G.12 – Advanced functions	76
Table J.1 – Correspondence between this document and the essential principles	95

INTERNATIONAL ELECTROTECHNICAL COMMISSION**MEDICAL DEVICES –
APPLICATION OF USABILITY ENGINEERING
TO MEDICAL DEVICES****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any medical device declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62366 has been prepared by a joint working group of subcommittee 62A: Common aspects of electrical medical equipment used in medical practice, of IEC technical committee 62: Electrical medical equipment in medical practice and technical committee ISO/TC 210: Quality management and corresponding general aspects for medical devices.

It is published as double logo standard.

The text of this standard is based on the following documents:

FDIS	Report of voting
62A/574/FDIS	62A/579/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by 20 P-members out of 20 having cast a vote.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this International Standard, the following print types are used:

- Requirements and definitions: roman type.
- *Means to assess compliance: italic type.*
- Informative material appearing outside of tables, such as notes, examples and references: in smaller type. Normative text of tables is also in a smaller type
- TERMS DEFINED IN CLAUSE 3 OR AS NOTED: SMALL CAPITALS.

The requirements are followed by means to assess compliance.

Clause and subclauses for which a rationale is provided in informative Annex A are marked with an asterisk (*).

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-