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ANSI/AAMI ST67:2011/ (R)2017

Sterilization of health care products—Requirements and guidance for selecting a sterility assurance level (SAL) for products labeled 'sterile'

Objectives and uses of AAMI standards and recommended practices

It is most important that the objectives and potential uses of an AAMI product standard or recommended practice are clearly understood. The objectives of AAMI's technical development program derive from AAMI's overall mission: the advancement of medical instrumentation. Essential to such advancement are (1) a continued increase in the safe and effective application of current technologies to patient care, and (2) the encouragement of new technologies. It is AAMI's view that standards and recommended practices can contribute significantly to the advancement of medical instrumentation, provided that they are drafted with attention to these objectives and provided that arbitrary and restrictive uses are avoided.

A voluntary *standard* for a *medical device* recommends to the manufacturer the information that should be provided with or on the product, basic safety and performance criteria that should be considered in qualifying the device for clinical use, and the measurement techniques that can be used to determine whether the device conforms with the safety and performance criteria and/or to compare the performance characteristics of different products. Some standards emphasize the information that should be provided with the device, including performance characteristics, instructions for use, warnings and precautions, and other data considered important in ensuring the safe and effective use of the device in the clinical environment. Recommending the disclosure of performance characteristics often necessitates the development of specialized test methods to facilitate uniformity in reporting; reaching consensus on these tests can represent a considerable part of committee work. When a drafting committee determines that clinical concerns warrant the establishment of *minimum* safety and performance criteria, referee tests must be provided and the reasons for establishing the criteria must be documented in the rationale.

A *recommended practice* provides guidelines for the use, care, and/or processing of a medical device or system. A recommended practice does not address device performance *per se*, but rather procedures and practices that will help ensure that a device is used safely and effectively and that its performance will be maintained.

Although a device standard is primarily directed to the manufacturer, it may also be of value to the potential purchaser or user of the device as a frame of reference for device evaluation. Similarly, even though a recommended practice is usually oriented towards healthcare professionals, it may be useful to the manufacturer in better understanding the environment in which a medical device will be used. Also, some recommended practices, while not addressing device performance criteria, provide guidelines to industrial personnel on such subjects as sterilization processing, methods of collecting data to establish safety and efficacy, human engineering, and other processing or evaluation techniques; such guidelines may be useful to health care professionals in understanding industrial practices.

In determining whether an AAMI standard or recommended practice is relevant to the specific needs of a potential user of the document, several important concepts must be recognized:

All AAMI standards and recommended practices are *voluntary* (unless, of course, they are adopted by government regulatory or procurement authorities). The application of a standard or recommended practice is solely within the discretion and professional judgment of the user of the document.

Each AAMI standard or recommended practice reflects the collective expertise of a committee of health care professionals and industrial representatives, whose work has been reviewed nationally (and sometimes internationally). As such, the consensus recommendations embodied in a standard or recommended practice are intended to respond to clinical needs and, ultimately, to help ensure patient safety. A standard or recommended practice is limited, however, in the sense that it responds generally to perceived risks and conditions that may not always be relevant to specific situations. A standard or recommended practice is an important *reference* in responsible decision-making, but it should never *replace* responsible decision-making.

Despite periodic review and revision (at least once every five years), a standard or recommended practice is necessarily a static document applied to a dynamic technology. Therefore, a standards user must carefully review the reasons why the document was initially developed and the specific rationale for each of its provisions. This review will reveal whether the document remains relevant to the specific needs of the user.

Particular care should be taken in applying a product standard to existing devices and equipment, and in applying a recommended practice to current procedures and practices. While observed or potential risks with existing equipment typically form the basis for the safety and performance criteria defined in a standard, professional judgment must be used in applying these criteria to existing equipment. No single source of information will serve to identify a particular product as "unsafe". A voluntary standard can be used as one resource, but the ultimate decision as to product safety and efficacy must take into account the specifics of its utilization and, of course, cost-benefit considerations. Similarly, a recommended practice should be analyzed in the context of the specific needs and resources of the individual institution or firm. Again, the rationale accompanying each AAMI standard and recommended practice is an excellent guide to the reasoning and data underlying its provision.

In summary, a standard or recommended practice is truly useful only when it is used in conjunction with other sources of information and policy guidance and in the context of professional experience and judgment.

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American National Standard

ANSI/AAMI ST67:2011/(R)2017
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Sterilization of health care products— Requirements and guidance for selecting a sterility assurance level (SAL) for products labeled “sterile”

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Abstract: This standard establishes requirements and guidance for selection of an appropriate sterility assurance level for terminally sterilized health care products.

Keywords: sterility assurance level (SAL), terminal sterilization

AAMI Standard

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Glossary of equivalent standards

International Standards adopted in the United States may include normative references to other International Standards. For each International Standard that has been adopted by AAMI (and ANSI), the table below gives the corresponding U.S. designation and level of equivalency to the International Standard. NOTE: Documents are sorted by international designation. The code in the US column, "(R)20xx" indicates the year the document was officially reaffirmed by AAMI. E.g., ANSI/AAMI/ISO 10993-4:2002/(R)2009 indicates that 10993-4, originally approved and published in 2002, was reaffirmed without change in 2009.

Other normatively referenced International Standards may be under consideration for U.S. adoption by AAMI; therefore, this list should not be considered exhaustive.

| International designation | U.S. designation | Equivalency |
|--|---|---|
| IEC 60601-1:2005 Technical Corrigendum 1 and 2 | ANSI/AAMI ES60601-1:2005 and ANSI/AAMI ES60601-1:2005/A2:2010 ANSI/AAMI ES60601-1:2005/C1:2009 (amdt) | Major technical variations C1 Identical to Corrigendum 1 & 2 |
| IEC 60601-1-2:2007 | ANSI/AAMI/IEC 60601-1-2:2007 | Identical |
| IEC 60601-2-2:2009 | ANSI/AAMI/IEC 60601-2-2:2009 | Identical |
| IEC 60601-2-4:2010 | ANSI/AAMI/IEC 60601-2-4:2010 | Identical |
| IEC 60601-2-16:2008 | ANSI/AAMI/IEC 60601-2-16:2008 | Identical |
| IEC 60601-2-19:2009 | ANSI/AAMI/IEC 60601-2-19:2009 | Identical |
| IEC 60601-2-20:2009 | ANSI/AAMI/IEC 60601-2-20:2009 | Identical |
| IEC 60601-2-21:2009 | ANSI/AAMI/IEC 60601-2-21:2009 | Identical |
| IEC 60601-2-24:1998 | ANSI/AAMI ID26:2004/(R)2009 | Major technical variations |
| IEC 60601-2-27:2011 | ANSI/AAMI/IEC 60601-2-27:2011 | Identical |
| IEC 60601-2-47:2001 | ANSI/AAMI EC38:2007 | Major technical variations |
| IEC 60601-2-50:2009 | ANSI/AAMI/IEC 60601-2-50:2009 | Identical |
| IEC 80001-1:2010 | ANSI/AAMI/IEC 80001-1:2010 | Identical |
| IEC 80601-2-30:2009 and Technical Corrigendum 1 | ANSI/AAMI/IEC 80601-2-30:2009 and ANSI/AAMI/IEC 80601-2-30:2009/ C1:2009 (amdt) – consolidated text | Identical (with inclusion) C1 Identical to Corrigendum 1 |
| IEC 80601-2-58:2008 | ANSI/AAMI/IEC 80601-2-58:2008 | Identical |
| IEC/TR 60878:2009 | ANSI/AAMI/IEC TIR60878:2003 | Identical |
| IEC/TR 62296:2009 | ANSI/AAMI/IEC TIR62296:2009 | Identical |
| IEC 62304:2006 | ANSI/AAMI/IEC 62304:2006 | Identical |
| IEC/TR 62348:2006 | ANSI/AAMI/IEC TIR62348:2006 | Identical |
| IEC/TR 62354:2009 | ANSI/AAMI/IEC TIR62354:2009 | Identical |
| IEC 62366:2007 | ANSI/AAMI/IEC 62366:2007 | Identical |
| IEC/TR 80002-1:2009 | ANSI/IEC/TR 80002-1:2009 | Identical |
| ISO 5840:2005 | ANSI/AAMI/ISO 5840:2005/(R)2010 | Identical |
| ISO 7198:1998 | ANSI/AAMI/ISO 7198:1998/2001/(R)2010 | Identical |
| ISO 7199:2009 | ANSI/AAMI/ISO 7199:2009 | Identical |
| ISO 8637:2010 | ANSI/AAMI/ISO 8637:2010 | Identical |
| ISO 8638:2010 | ANSI/AAMI/ISO 8638:2010 | Identical |
| ISO 10993-1:2009 | ANSI/AAMI/ISO 10993-1:2009 | Identical |
| ISO 10993-2:2006 | ANSI/AAMI/ISO 10993-2:2006/(R)2010 | Identical |
| ISO 10993-3:2003 | ANSI/AAMI/ISO 10993-3:2003/(R)2009 | Identical |
| ISO 10993-4:2002 and Amendment 1:2006 | ANSI/AAMI/ISO 10993-4:2002/(R)2009 and Amendment 1:2006/(R)2009 | Identical |
| ISO 10993-5:2009 | ANSI/AAMI/ISO 10993-5:2009 | Identical |
| ISO 10993-6:2007 | ANSI/AAMI/ISO 10993-6:2007/(R)2010 | Identical |
| ISO 10993-7:2008 | ANSI/AAMI/ISO 10993-7:2008 | Identical |
| ISO 10993-9:2009 | ANSI/AAMI/ISO 10993-9:2009 | Identical |
| ISO 10993-10:2010 | ANSI/AAMI/ISO 10993-10:2010 | Identical |
| ISO 10993-11:2006 | ANSI/AAMI/ISO 10993-11:2006/(R)2010 | Identical |
| ISO 10993-12:2007 | ANSI/AAMI/ISO 10993-12:2007 | Identical |
| ISO 10993-13:2010 | ANSI/AAMI/ISO 10993-13:2010 | Identical |
| ISO 10993-14:2001 | ANSI/AAMI/ISO 10993-14:2001/(R)2006 | Identical |
| ISO 10993-15:2000 | ANSI/AAMI/ISO 10993-15:2000/(R)2006 | Identical |
| ISO 10993-16:2010 | ANSI/AAMI/ISO 10993-16:2010 | Identical |
| ISO 10993-17:2002 | ANSI/AAMI/ISO 10993-17:2002/(R)2008 | Identical |
| ISO 10993-18:2005 | ANSI/AAMI BE83:2006 | Major technical variations |
| ISO/TS 10993-19:2006 | ANSI/AAMI/ISO TIR10993-19:2006 | Identical |
| ISO/TS 10993-20:2006 | ANSI/AAMI/ISO TIR10993-20:2006 | Identical |
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| ISO/TS 11135-2:2008 | ANSI/AAMI/ISO TIR11135-2:2008 | Identical |
| ISO 11137-1:2006 | ANSI/AAMI/ISO 11137-1:2006/(R)2010 | Identical |
| ISO 11137-2:2006 (2006-08-01 corrected) | ANSI/AAMI/ISO 11137-2:2006 | Identical |
| ISO 11137-3:2006 | ANSI/AAMI/ISO 11137-3:2006/(R)2010 | Identical |
| ISO 11138-1:2006 | ANSI/AAMI/ISO 11138-1:2006/(R)2010 | Identical |
| ISO 11138-2:2006 | ANSI/AAMI/ISO 11138-2:2006/(R)2010 | Identical |
| ISO 11138-3:2006 | ANSI/AAMI/ISO 11138-3:2006/(R)2010 | Identical |
| ISO 11138-4:2006 | ANSI/AAMI/ISO 11138-4:2006/(R)2010 | Identical |
| ISO 11138-5:2006 | ANSI/AAMI/ISO 11138-5:2006/(R)2010 | Identical |
| ISO/TS 11139:2006 | ANSI/AAMI/ISO 11139:2006 | Identical |
| ISO 11140-1:2005 | ANSI/AAMI/ISO 11140-1:2005/(R)2010 | Identical |
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| ISO 11140-4:2007 | ANSI/AAMI/ISO 11140-4:2007 | Identical |
| ISO 11140-5:2007 | ANSI/AAMI/ISO 11140-5:2007 | Identical |
| ISO 11607-1:2006 | ANSI/AAMI/ISO 11607-1:2006/(R)2010 | Identical |
| ISO 11607-2:2006 | ANSI/AAMI/ISO 11607-2:2006/(R)2010 | Identical |
| ISO 11663:2009 | ANSI/AAMI/ISO 11663:2009 | Identical |
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| ISO 14161:2009 | ANSI/AAMI/ISO 14161:2009 | Identical |
| ISO 14708-3:2008 | ANSI/AAMI/ISO 14708-3:2008 | Identical |
| ISO 14708-4:2008 | ANSI/AAMI/ISO 14708-4:2008 | Identical |
| ISO 14708-5:2010 | ANSI/AAMI/ISO 14708-5:2010 | Identical |
| ISO 14937:2009 | ANSI/AAMI/ISO 14937:2009 | Identical |
| ISO/TR 14969:2004 | ANSI/AAMI/ISO TIR14969:2004 | Identical |
| ISO 14971:2007 | ANSI/AAMI/ISO 14971:2007/(R)2010 | Identical |
| ISO 15223-1:2007 and A1:2008 | ANSI/AAMI/ISO 15223-1:2007 and A1:2008 | Identical |
| ISO 15223-2:2010 | ANSI/AAMI/ISO 15223-2:2010 | Identical |
| ISO 15225:2010 | ANSI/AAMI/ISO 15225:2010 | Identical |
| ISO 15674:2009 | ANSI/AAMI/ISO 15674:2009 | Identical |
| ISO 15675:2009 | ANSI/AAMI/ISO 15675:2009 | Identical |
| ISO 15882:2008 | ANSI/AAMI/ISO 15882:2008 | Identical |
| ISO 15883-1:2006 | ANSI/AAMI/ST15883-1:2009 | Major technical variations |
| ISO/TR 16142:2006 | ANSI/AAMI/ISO TIR16142:2005 | Identical |
| ISO 17664:2004 | ANSI/AAMI/ST81:2004 | Major technical variations |
| ISO 17665-1:2006 | ANSI/AAMI/ISO 17665-1:2006 | Identical (with inclusions) |
| ISO/TS 17665-2:2009 | ANSI/AAMI/ISO TIR17665-2:2009 | Identical |
| ISO 18472:2006 | ANSI/AAMI/ISO 18472:2006/(R)2010 | Identical |
| ISO/TS 19218:2005 | ANSI/AAMI/ISO 19218:2005 | Identical |
| ISO 20857:2010 | ANSI/AAMI/ISO 20857:2010 | Identical |
| ISO 22442-1:2007 | ANSI/AAMI/ISO 22442-1:2007 | Identical |
| ISO 22442-2:2007 | ANSI/AAMI/ISO 22442-2:2007 | Identical |
| ISO 22442-3:2007 | ANSI/AAMI/ISO 22442-3:2007 | Identical |
| ISO 23500:2011 | ANSI/AAMI/ISO 23500:2011 | Identical |
| ISO 25539-1:2003 and A1:2005 | ANSI/AAMI/ISO 25539-1:2003/(R)2009 and A1:2005/(R)2009 | Identical |
| ISO 25539-2:2008 | ANSI/AAMI/ISO 25539-2:2008 | Identical |
| ISO 26722:2009 | ANSI/AAMI/ISO 26722:2009 | Identical |
| ISO 27186:2010 | ANSI/AAMI/ISO 27186:2010 | Identical |
| ISO 80369-1:2010 | ANSI/AAMI/ISO 80369-1:2010 | Identical |
| ISO 81060-1:2007 | ANSI/AAMI/ISO 81060-1:2007 | Identical |
| ISO 81060-2:2009 | ANSI/AAMI/ISO 81060-2:2009 | Identical |

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Association for the Advancement of Medical Instrumentation AAMI Sterility Assurance Level (SAL) Working Group

This standard was developed by the AAMI Sterility Assurance Level (SAL) Working Group under the auspices of the AAMI Sterilization Standards Committee. Approval of this standard does not necessarily mean that all working group members voted for its approval.

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Foreword

This standard was developed by the AAMI Sterility Assurance Level (SAL) Working Group (formerly the Microbiological Quality [SALs] of Processed Medical Devices Working Group) under the auspices of the AAMI Sterilization Standards Committee.

The purpose of this standard is to codify current North American sterilization practices and provide a standardized framework for determining appropriate SALs.

While the 2003 edition of ANSI/AAMI ST67 was very restrictive in what was required for supporting the use of SALs other than 10^{-6} , this updated version allows manufacturers to select an alternate SAL, such as 10^{-5} or 10^{-4} , for those types of products that are sensitive to 10^{-6} sterilization processes. The revised standard requires the use of the most rigorous SAL that the product can withstand, as well as a risk assessment in order to select an alternate SAL. This focus on risk assessment aligns with other regulatory documents.

As used within the context of this standard, "shall" indicates requirements strictly to be followed in order to conform to the standard; "should" indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action should be avoided but is not prohibited; "may" is used to indicate that a course of action is permissible within the limits of the standard; and "can" is used as a statement of possibility and capability. "Must" is used only to describe "unavoidable" situations, including those mandated by government regulation.

AAMI and ANSI procedures require that standards be reviewed every five years and, if necessary, revised to reflect technological advances that may have occurred since publication.

The concepts incorporated in this standard should be considered flexible and dynamic. AAMI policies and procedures require that AAMI standards and recommended practices be reviewed and, if necessary, revised at least once every five years. To remain relevant, it must be modified as technological advances are made and as new data comes to light.

Suggestions for improving this standard are invited. Comments and suggested revisions should be sent to Technical Programs, AAMI, 4301 N. Fairfax Drive, Suite 301, Arlington, VA 22203-1633.

NOTE—This foreword does not contain provisions of the AAMI standard *Sterilization of medical devices—Requirements for products labeled "sterile"* (ANSI/AAMI ST67:2011), but it does provide important information about the development and intended use of the document.

For a complete copy of this AAMI document, contact AAMI at
+1-877-249-8226 or visit www.aami.org.