AS/NZS 3666.4:2011

Australian/New Zealand Standard™

Air-handling and water systems of buildings—Microbial control

Part 4: Performance-based maintenance of air-handling systems (ducts and components)

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee ME-062, Ventilation and Airconditioning. It was approved on behalf of the Council of Standards Australia on 20 July 2011 and on behalf of the Council of Standards New Zealand on 25 July 2011.
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The following are represented on Committee ME-062:

Air Conditioning and Mechanical Contractors Association
Australasian Fire and Emergency Service Authorities Council
Australian Building Codes Board
Australian Institute of Refrigeration Air Conditioning and Heating
Chartered Institution of Building Services Engineers
Climate Control Companies Association
Consumer Electronics Suppliers Association
Department of Health and Human Services, Tas.
Engineers Australia
Facility Management Association of Australia
Institute of Refrigeration Heating & AirConditioning Engineers of New Zealand
NSW Health Department
Plastics and Chemicals Industries Association
Plumbing Industry Commission

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PREFACE

This Standard was prepared by Joint Standards Australia/Standards New Zealand Committee ME-062, Ventilation and Airconditioning.

This Standard forms Part 4 of a series of Standards for microbial control of air-handling and water systems of buildings as follows:

AS/NZS		
3666		Air-handling and water systems of buildings—Microbial control
3666.1	Part 1:	Air-handling and water systems of buildings—Microbial control—Design, installation and commissioning
3666.2	Part 2:	Operation and maintenance
3666.3	Part 3:	Performance-based maintenance of cooling water systems
3666.4	Part 4:	Performance-based maintenance of air-handling systems (ducts and components)

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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FOREWORD

Most microbial contamination at buildings arises from the individual occupants who shed bacteria and fungi from the skin. When infected with disease, spread is directly by person-to-person contact or indirectly as a result of droplets in air that are produced by talking, sneezing and coughing.

Logically, such diseases could also be transmitted through building-related airborne pathways such as ducted air-handling systems although documented instances are rare and isolated.

Although air-handling systems are unlikely sources of growth for *Legionella* bacteria (other than at humidifiers), they may act as conduits for transmission of these and other pathogens from outdoor environment.

On the other hand, airborne allergens may result from improperly maintained air-handling plant should conditions suit the growth of viable agents including adaptive bacteria, fungi, amoebae and perhaps algae. Non-viable agents include house dust, insect parts, animal danders, cockroach and mite faecal matter, remains of moulds and their spores, pollens, and dried animal faecal matter. These may lead to allergic reactions on human skin or airways; some people have a genetic predisposition toward allergies.

At air-handling systems, maintenance of hygienic conditions is known to be a suitable method of addressing niches that may otherwise allow growth and spread of airborne microbial matter or antigenic material.

Remediation generally involves addressing visible collections of extraneous matter, including internal surfaces of ductwork. For dry dust presence, use of HEPA filtered vacuum cleaning may be needed. For wetted lining surfaces, replacement of the lining may be needed, and for fungal/bacterial growths the water or moisture activity needs to be eliminated or surfaces periodically cleaned. Use of biocides in air-handling systems may not only be hazardous but the dead microorganisms created may provide nutrients for future growth of spores.

Performance-based maintenance for microbial control is of the preventative type, i.e. it is performed to suit site conditions without necessarily following set frequencies as prescribed in AS/NZS 3666.2. Durability, reliability, efficiency, and health and safety remain of paramount importance.

Components of air handling plant need to be kept clean so as not to waste energy. If heat exchange coils are dirty, resistance to air flow and heat exchange ultimately impose energy handicaps (reduced chiller and boiler efficiencies and increased fan energy consumption). Similarly, air filters allowed to exceed recommended pressure drop characteristics impose an air flow or energy penalty.

Effectiveness of the performance approach is dependent upon the experience and judgement of the facility management team. The use of a methodical risk management plan for maintenance, as required by this Standard, should assist them.

The risk management methodology provides for a verification step to confirm that contaminant sources are controlled so that the air-handling system is in fact providing acceptable air quality and meets the same level of maintenance described in AS/NZS 3666.2, Clause 2.3.5.

Further explanatory information and helpful guidance can be found in the Standards Australia/Standards New Zealand Handbook HB 32, *Control of microbial growth in air-handling and water systems of buildings,* and in several publications produced by the Australian Institute of Refrigeration Air Conditioning and Heating including:

DA 26 Indoor Air Quality

Best Practice Guidelines: HVAC Hygiene.

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Australian/New Zealand Standard
Air-handling and water systems of buildings—Microbial control

Part 4: Performance-based maintenance of air-handling systems (ducts and components)

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard outlines a performance-based approach to the maintenance of ducts and components forming air-handling systems with respect to the control of microorganisms, within such systems. This approach is based on known risk factors combined with maintenance practices and compliance monitoring to create hygienic conditions within such systems of buildings.

The provisions of this Standard are an alternative to the prescriptive requirements of AS/NZS 3666.2 (Clause 2.3.5) for the maintenance of air-handling systems other than those incorporating water-supplied devices such as humidifiers and evaporative coolers.

NOTE: This Standard addresses only the performance of maintenance programs and is to be read in conjunction with AS/NZS 3666.1 and the relevant clauses of AS/NZS 3666.2. Aspects such as maintenance manuals, records, log books, safety procedures, and the like, are as important for the application of this Standard as they are for a prescriptive approach to maintaining a clean system.

1.2 OBJECTIVE

The objective of this Standard is to provide a performance-based approach to the maintenance of hygienic conditions with air-handling systems of buildings.

1.3 NORMATIVE REFERENCES

The following are the normative documents referred to in this Standard:

AS
1668 The use of mechanical ventilation and air-conditioning in buildings
1668.2 Part 1: Mechanical ventilation for acceptable indoor-air quality

AS/NZS
3666 Air-handling and water systems of buildings—Microbial control
3666.1 Part 1: Design installation and commissioning
3666.2 Part 2: Operation and maintenance
3666.3 Part 3: Performance-based maintenance of cooling water systems

1.4 FUNCTIONAL STATEMENT

Air-handling systems of buildings shall be maintained and monitored to minimize the growth and dissemination of microorganisms in and by such systems.