

Application Guide AG 19/2000

GUIDE TO LEGIONELLOSIS

- Operation & Maintenance

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BSRIA

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The logo for BSRIA, consisting of the letters 'BSRIA' in a large, bold, serif font.

ACKNOWLEDGEMENTS

BSRIA would like to thank Defence Estates for their support of this publication.

BSRIA would also like to thank Paul Appleby of Thornburn Colqhoun for the original drafts and the following for commenting on the publication:

Mike Bealing	Thorburn Colqhoun
Chris Dobson	Welsh Health Estates
Stephen Hartley	Hertel (UK) Ltd
Brian Loader	Aquazur
John Wilson	WaterTech Ltd
Chris Brown	Brocol Consultants Ltd

Contributing from BSRIA were: Reginald Brown and Mark Roper
Acknowledgement is also given to John Newbold and Ken Ashley of HSE who were responsible for revising the Approved Code of Practice.

Every opportunity has been taken to incorporate the views and comments of those mentioned but final editorial control of this document rests with BSRIA.

PREFACE

Ever since the recognition of legionellosis and its causes in the early 1970s, the UK has been at the forefront of those countries offering practical advice for industry on risk control measures. As a result of the guidance provided by HSE, CIBSE, BSRIA and others and regulatory initiatives such as the 1995 *Approved Code of Practice for the prevention or control of legionellosis* (ACOP) and the registration of cooling towers, the levels of awareness amongst the building services community are high and cases are much less frequent than they might otherwise be. In fact, of the 200-250 cases of Legionnaires' disease reported each year, approximately half are contracted abroad.

During 1998 several organisations, including HSE, CIBSE, WMS and BSRIA, independently decided to review their published advice in the light of 20 years' operational experience, new legionellosis control options and new research findings.

This guide was written to offer technical guidance to facilities managers and maintenance personnel on the operation and maintenance of water related services in buildings to minimise the risk of legionellosis. It should be read and used in conjunction with the new HSC *Approved Code of Practice and Guidance: Legionnaires' Disease: The control of legionella bacteria in water systems* which details the requirements for risk assessment and risk management of water related systems¹.

¹ This document replaces the previous *Approved Code of Practice for the Prevention or Control of Legionellosis* (ACOP L8) and HS(G)70 guidance.

EXECUTIVE SUMMARY

This guide briefly summarises the regulatory situation and risk assessment process for the control of legionellosis, but concentrates on the management and technical issues of the operation and maintenance of water systems to minimise and control the risk. It discusses management procedures and the technical issues surrounding disinfection, routine monitoring, operation and maintenance tasks. It does not cover the design of systems, though the underlying principles will be evident².

The guidance is consistent with the new HSC *Approved Code of Practice and Guidance: Legionnaires' Disease: The control of legionella bacteria in water systems*, which details the requirements for risk assessment and risk management of water related systems. That document should be available to all those involved in the management, operation and maintenance of water systems.

The appendices contain advice on tendering for water treatment, detailed recommendations for the monitoring frequency for different types of water systems and a summary of technical risk control and prevention options. The guide is supported by a *Legionellosis control logbook* (available separately) and a number of other BSRIA documents, including:

- *Guide to legionellosis: Temperature measurements for hot and cold water services*
- *Guide to legionellosis risk assessment*
- *Standard specification for water hygiene risk assessment.*

² Design is expected to be covered by a forthcoming CIBSE publication which will replace TM13. Some design guidance is also available from Part 2 of the Approved Code of Practice.

CONTENTS

GLOSSARY	i
1 INTRODUCTION	1
1.1 Purpose of this guide	1
1.2 What is legionellosis?.....	1
1.3 Why are legionellae a problem in buildings?.....	1
1.4 Controlling the risk of legionellosis	2
1.5 Duties imposed by regulations	2
1.6 Operation and maintenance contracts	2
2 POLICY	3
2.1 Summary of legislation.....	3
2.2 Management systems.....	5
2.3 Risk assessments	5
2.4 Record keeping.....	5
3 LEGIONELLOSIS RISK ASSESSMENT	7
3.1 Introduction	7
3.2 Identification of risk systems	7
3.3 Risk assessment.....	7
3.4 Periodic risk reviews	9
4 OPERATION AND MAINTENANCE OF WATER SYSTEMS	10
4.1 General	10
4.2 Management responsibilities.....	10
4.3 Operating and maintenance manual	11
4.4 Training	12
4.5 Log book.....	12
4.6 Interpretation of test results.....	13
4.7 Water quality	15
4.8 Water treatment.....	18
4.9 Temperature measurements.....	19
4.10 Water treatment contractor.....	20
4.11 General maintenance	21
4.12 Cleaning and disinfection.....	21
4.13 Pasteurisation and calorifiers	24
4.14 Regular flushing of hot and cold water services	25
4.15 Periodic inspections.....	25
4.16 Domestic water systems temporarily out of use.....	25
4.17 Other water systems temporarily out of use.....	26
4.18 Monitoring the effectiveness of control	26
INDEX.....	39

APPENDICES

Appendix A Risk control and prevention options 28
Appendix B Suggested monitoring tasks 30
Appendix C Cooling tower operations..... 33
Appendix D Tendering for water treatment 36

TABLES

Table 1 Action levels for cooling water systems..... 14
Table 2 Action levels for hot & cold water systems..... 15
Table 3 Water treatment options for the control of legionella in water systems..... 18

1 INTRODUCTION

1.1 PURPOSE OF THIS GUIDE

This guide is one of a series of publications prepared by BSRIA to assist building managers, maintenance personnel and contractors to control the risk of legionellosis from building services. In particular it deals with the operation and maintenance of building services and the practical application of the Health & Safety Commission *Approved Code of Practice and Guidance: Legionnaires' Disease: The control of legionella bacteria in water systems*³(ACOP).

Apart from providing guidance in a relatively digestible form, the Approved Code of Practice part of the ACOP document has special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you have not followed the relevant provisions of the Code, a court will find you at fault, unless you can prove that you have complied with the law in some other way.

All persons responsible for water systems are strongly advised to hold a copy of the ACOP for reference.

This guide does not specifically address the issues of the selection of services or plant design in new and refurbished buildings, though these are evidently major determinants of risk. General guidance for reducing the risk of legionellosis during system design and specification is included in the ACOP and publications such as CIBSE TM13 (currently under revision).

The legionellosis risk assessment is briefly outlined but for detailed information readers should refer directly to the ACOP and other BSRIA publications such as the *Guide to legionellosis risk assessment* and *Standard specification for water services risk assessment*.

1.2 WHAT IS LEGIONELLOSIS?

Legionellosis is the term used for infections caused by *Legionella pneumophila* and other bacteria from the family Legionellaceae. Legionnaires' disease is a pneumonia that principally affects those who are susceptible due to age, illness, immuno-suppression, smoking etc. and may be fatal. Legionellae can also cause less serious illnesses such as Pontiac and Lochgoilhead fevers which can affect all people.

Infection is attributed to inhaling legionella bacteria, in water droplets which are small enough (<5 µm) to penetrate deeply into the lung.

1.3 WHY ARE LEGIONELLAE A PROBLEM IN BUILDINGS?

Legionella bacteria are widespread in natural sources of water. They may enter man-made systems where, under favourable conditions, they can multiply. If water droplets are created and dispersed into the atmosphere from those systems then people in the vicinity may be at risk.

³ This document came into effect on 1 January 2000 and replaces both the 1995 ACOP and HS(G)70.

Most cases and outbreaks of legionellosis have been attributed to water services in buildings, cooling towers and whirlpool spas. Other sources have been identified in foreign outbreaks including a humidification system, industrial coolants and respiratory therapy equipment.

1.4 CONTROLLING THE RISK OF LEGIONELLOSIS

A number of factors are required to create a risk of legionellosis:

- the presence of legionella bacteria
- conditions suitable for the proliferation of those bacteria
- a means of creating and disseminating an aerosol
- the presence of individuals who may be exposed.

The conditions favouring the proliferation of legionella are:

- Moisture
- Temperature between 20°C and 50°C
- Availability of nutrients, for example from sediment, sludge, organic material, scale, rust, compatible organisms and materials used in construction of water systems
- Presence of biofilm⁴ (bacterial slime) on surfaces in contact with water.

The elimination of as many of these conditions as possible forms the basis for **control** of the risk. Treatment regimes to eradicate or reduce the proliferation of legionella (based on physical or chemical disinfection of water systems) also help to control the risk but do not prevent it.

The **prevention** of risk requires the elimination of the possibility of exposure to water spray or aerosol, eg. by replacing wet systems with dry ones.

1.5 DUTIES IMPOSED BY REGULATIONS

Building managers may be criminally responsible under the Health and Safety at Work etc Act 1974 and subsidiary regulations, not only for their employees but for all those who are at risk including visitors and members of the public. That risk, particularly in the case of poorly maintained cooling towers, may extend well beyond the boundaries of the building or site.

1.6 OPERATION AND MAINTENANCE CONTRACTS

The operation and maintenance of water systems to control the risk of legionellosis may be wholly undertaken using suitably trained in-house personnel or contractors, but it is likely that a specialist contractor will be employed to undertake or advise on water treatment. Where contractors are intended to be used it is essential to validate their qualifications and experience during the tender process.

⁴ Biofilm may not be visible to the naked eye.