



REMOVAL OF PACK FROM COOLING TOWERS FOR CLEANING AND INSPECTION



1 Organisations involved

Health & Safety Executive, Local Authorities

2 Introduction

In the United Kingdom, the Approved Code of Practice (ACOP) and Guidance 'Legionnaires' disease - The control of *Legionella* in water systems' L8 [1] are the main sources of advice issued by the Health & Safety Executive [2] concerning the risk from exposure to *Legionella*. This guidance is aligned to the requirements of both the Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health 2002. The Approved Code also gives guidance on compliance with relevant parts of the Management of Health and Safety at Work Regulations 1999.

Part 1 of the ACOP [1] covers general safety issues, such as the identification, assessment, prevention or control and management of the risk, plus matters of training and competence and good record keeping. Part 2 reflects more specific issues, including control of the bacteria in water or cooling systems, management of cooling towers, treatment programmes, monitoring, cleaning and disinfection, hot and cold water services and matters relating to system design and construction.

Cooling towers contain pack or fill that consist of multiple, mainly vertical, wetted surfaces upon which a thin film of water spreads. This allows a vastly expanded air-water interface for heating of the air and evaporation to take place. Pack is often situated in the most inaccessible part of the cooling tower. Inspection of the pack to monitor its physical condition is therefore often difficult. Yet the pack is one of the main areas of a cooling tower system where scale, debris and biofilm are likely to accumulate, and it can be the most difficult area to clean adequately in situ.

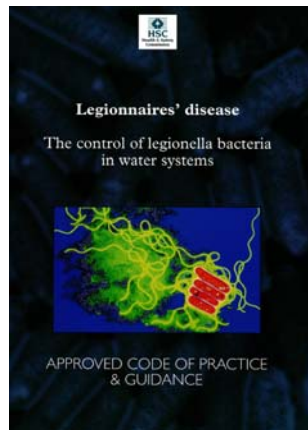
The practicality of cooling tower pack cleaning and inspection therefore is not straightforward and is influenced by many factors such as design of the cooling tower. The design may physically prevent the removal of pack for cleaning. There are worker safety issues in the removal of pack such as manual handling, working at heights, working in confined and restricted spaces as well as exposures to the cleaning chemicals. Equally, there is the issue of time and cost as the cooling tower is inoperable during the entire cleaning process so removal of pack for cleaning will have a greater impact on the business.

It is felt by HSE [2] that ensuring that the pack remains in a clean state is an important part of any *Legionella* control strategy and HSE expects cooling tower users to follow the ACOP and guidance (L8) [1] to achieve this goal. However, there has been confusion regarding the need for removal of the pack for cleaning. Current figures in the UK suggest that probably only 50% of users of cooling towers regularly remove pack for cleaning [3]. Whereas it is not mandatory to remove pack for cleaning, HSE [2] expects it to be considered in a risk assessment and any alternative method of cleaning to be demonstrable. In the UK, certificates of cleaning and disinfection of cooling towers are issued by specialist cleaning contractors that can testify that the cooling towers have been cleaned and disinfected in accordance with the ACOP L8 [1]. However close questioning by HSE inspectors

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reveals that this does not always include pack removal, even if it has been identified as a requirement in a risk assessment or in cleaning procedures [3]. Risk assessments often do not consider pack removal in sufficient detail to reach a considered conclusion on the need for it, nor the frequency. Clarification of advice given in the ACOP L8 [1] was therefore necessary.

Picture 1: Front cover of the Approved Code of Practice (ACOP) and Guidance ‘Legionnaires’ disease



Source: HSE

3.1. Aims

The aim of this guidance was:

- To clarify the guidance given in the ACOP L8 [1]
- To promote a consistency of approach to the need for removal of pack for cleaning
- To provide advice on the factors which may inform decisions on pack removal for cleaning and inspection

3.2. What was done, and how?

A Principal HSE Specialist Occupational Hygiene Inspector was given the task of examining the content of ACOP L8 [1] and producing a Guidance Note to clarify the requirements for pack cleaning and inspection. The Guidance Note outlines the considerations that have to be made in determining the process of pack cleaning. These include weighing up the risk from *Legionella* versus the safety of workers and the practicality of removing and reinstalling the pack, the history of the cooling tower in respect to performance and past visual inspections and an appraisal of the condition of the cooling tower in advance of a scheduled clean and disinfection. This Guidance Note includes a risk assessment-led approach for cooling tower users to determine whether pack needs to be removed and replaced with new pack, whether it can be removed, cleaned and returned or whether it must be cleaned in situ. It also outlines methods of demonstrating pack cleanliness.

A section in the Guidance Note examines the construction of cooling towers in relation to the feasibility of removing pack. It emphasises the duties of cooling tower manufacturers, importers, suppliers and installers regarding the design, manufacture, supply and installation of equipment for use at work.

The Guidance Note was circulated to the Legionella Control Association (LCA), a UK-based committee consisting of representatives from the water management industry, Health Protection



Agency and HSE as well as the Water Management Society and British Association of Chemical Specialities (BACS) for peer review.

The Guidance Note is accessible on the HSE website [2] and has been promoted within the water management industry including specialist cooling tower cleaning contractors by the LCA and BACS.

<http://www.hse.gov.uk/legionnaires/coolingtowers.htm>

In summary,

- The Guidance Note to L8, issued by the Health & Safety Executive, provides clarification that pack removal for cleaning is not mandatory but if not performed, evidence of cleaning must be demonstrated;
- The information refers closely to that in the ACOP L8.

The Guidance Note provides a valuable source of the information needed by the cooling tower users in order to develop a risk assessment for the maintenance of the cooling tower. A section in the Appendix outlines factors to consider when appraising the condition of the cooling tower pack as well as information that indicates the extent of deposits of scale and biofilm. Further important factors are as follows:

- The guidance serves to remind duty holders of the importance of cooling tower pack cleaning and inspection, while also giving them the tools to determine by a risk assessment approach whether pack should be cleaned in situ or removed;
- Cooling tower designers and manufacturers have been reminded of the importance of including inspection hatches and allowing pack to be removed easily for cleaning;
- There is a common understanding between dutyholders and health and safety inspectors as to what is required of the duty holder with respect to pack cleaning.

3.3. What was achieved?

Following publication of the Guidance Note on the HSE website

- Duty holders are clear that they have to demonstrate the cleanliness of cooling tower pack regardless of whether cleaned externally or in situ;
- HSE inspectors know that the cleanliness of the pack must be demonstrated to them;
- Specialist contractors and duty holders are aware of that cooling tower pack cleaning and inspection must be addressed in a cooling tower risk assessment.

Feedback from the users of the Guidance Note was that it was not easily accessible on the HSE website as it was not linked to the "Legionella" topic area

3.4. Success factors

An important success factor in the development of this guidance was the high level of cooperation between the UK water management industry, industry associations (Legionella Control Association, Water Management Society, British Association of Chemical Specialities), the Health Protection Agency which represents the interests of public health and occupational health and safety inspectors (HSE). This co-operation, driven by regular meetings, has over the years led to the development of practical based guidance in a number of areas related to *Legionella control*. *Development of the pack cleaning guidance was driven by an HSE occupational hygiene inspector with several years' experience in Legionella control who liaised with several companies and undertook site visits to ensure that the recommendations for cooling tower pack cleaning were realistic and fit for purpose. Before the guidance was released it was opened for consultation and comment from industry representatives, and feedback indicated that it was a positive addition to the range of guidance on*



Legionella control put out by HSE and HPA [3,4]. It has also achieved the aim to clarify the duty placed upon companies as to whether or not they need to remove pack for cleaning.

3.5. Further information

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3.6. Transferability

Although the information on legal requirements may be specific to the United Kingdom, the fundamental information about risk factors and controls required for cooling tower pack inspection in this Guidance Note is universally applicable.

3.7. Abstract

The UK Approved Code of Practice (ACOP) and Guidance 'Legionnaires' disease - The control of *Legionella* in water systems' L8 recommends that the packing material used in cooling towers should be inspected and cleaned regularly to reduce the potential for *Legionella* colonisation. Duty holders and specialist cleaning providers perceived from the guidance that it was mandatory to remove the pack for cleaning and inspection. This is not so. Therefore HSE, the enforcers of L8, wrote a supplementary Guidance Note to clarify the situation.

4. References, resources:

1. Legionnaires' disease. The control of legionella bacteria in water systems. Approved Code of Practice and guidance L8 (<http://www.hse.gov.uk/pubns/books/l8.htm>)
2. Health & Safety Executive (<http://www.hse.gov.uk>)
3. Removal of pack from cooling – Guidance
4. (<http://www.hse.gov.uk/legionnaires/coolingtowers.htm>)
5. Health Protection Agency. Guidance on Legionnaires' disease (<http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAZ/1191942128213/>)