



Maritime and Coastguard Agency

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## Contamination of Ships' Air Conditioning Systems by Legionella Bacteria

Notice to Shipowners, Masters, Fishing Vessel Skippers, Shipbuilders and Repairers

*This Notice supersedes Merchant Shipping Notice No. 1215*

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### *Summary*

This note warns against the risk of Legionnaire's Disease being transmitted to humans via air conditioning plants.

- The Guidance Note identifies main danger areas within the air conditioning system.
- Examples of counter measures are given in section 3.

### 1. PREAMBLE

The risk of Legionnaire's Disease being transmitted to humans via air conditioning plants fitted ashore in large buildings, for example hotels or hospitals, is well documented. The bacteria flourishes in stagnant water or sludge or, for example, in cooling tower elements where the wet matrix material may be encrusted with scale, dirt or organic matter such as dead insects, birds and leaves. It is possible that sites may exist in ships' air conditioning systems where similar contamination can arise notwithstanding that these are of fundamentally different design and the normal ambient air is salt laden.

### 2. MAIN DANGER AREAS

**2.1 Air Inlet Arrangements** - These may be direct or indirect from the air conditioning room via a jalousie. The design of jalousie fins is relevant in either case because with direct air inlets rain water may be driven into the filter; and with indirect inlets stagnant rain water may accumulate within the space unless efficient drainage and scuppering is fitted.

**2.2 Filter** - A normal filter comprises a mat of synthetic material of resin bonded fibres approximately 25 millimetres thick. Such filters are washable whereas others of the fibreglass variety have to be replaced. As the filter can become quite wet from inducted rain water, and dirty with matter such as insects, soot and cargo dust, nutrients may be available in ideal temperature conditions which could breed the bacteria. This could be quite a rapid process.

**2.3 Cooler Unit (Dehumidifier)** - Condensate sumps and their drainage arrangements if not properly designed and maintained can result in stagnant water accumulating in the unit's sump in way of the air flow and, in the event of blocked drains, an overflow of stagnant condensate from the unit into the air conditioning room itself can occur. A further problem is the possibility of water carryover into the distribution air stream if the face velocity over the cooler block is greater than 2 metres per second (400 feet per minute), unless an effective moisture eliminator is fitted after the cooler.

**2.4 Humidifier** - This item is usually fitted according to the owner's requirements. The normal practice of using steam humidification should not be a problem. However adiabatic humidifiers of the water spray type may offer a special hazard. The enclosed tank and matrix elements provide ideal opportunities for contamination. A further problem may occur with the carry over of water droplets into the distribution air stream unless means are provided to avoid this.

**2.5 Plenum Insulation** - The main air conditioning unit chamber in modern equipment is acoustic and heat insulated with a PVC GRP scrim faced Rockwool or similar material exposed to the air stream and this could harbour bacteria if the facing fails to keep the insulation dry: noting that in the region of the cooler unit, or the humidifier when fitted, considerable quantities of water are present.

### 3. RECOMMENDED COUNTER MEASURES

**3.1 Intakes** - The jalousie design and the intake arrangements should be designed to eliminate spray and there should be proper attention to efficient drainage where necessary.

**3.2 Filters** - These should be readily accessible for regular maintenance or replacement. Weekly inspection of filters is recommended, washing or replacing them as necessary. Washable filters should be thoroughly rinsed in a super-chlorinated solution of 50 ppm. The frequency of routine inspection cleaning or replacement may require to be increased when the current rate of fouling caused by polluted ambient air at the intake is high.

**3.3 Cooler** - Careful design of the condensate sump and its drainage is necessary. The sump drains should be regularly inspected and cleaned to ensure that there is no spillage or accumulation of stagnant condensate. It is recommended that the sump be washed through with a super-chlorinated solution of 50 ppm at intervals not exceeding 3 months.

**3.4 Adiabatic Spray Type Humidifiers** - This type should be installed in new ships unless special measures are taken to reduce the risk. In existing ships an effective moisture eliminator should be introduced if water carryover into the discharge air stream is found to occur. Regular maintenance and sterilisation of the water spray system is necessary. Modification of humidifier drains and circulating tank pipe suctions and drains should be considered if these are not sited in the bottom face of the unit or tank respectively.

**3.5 Plenum Insulation** - In new ships a watertight facing should be fitted. In existing ships the facing of the insulation should be examined at refit periods to ensure that the insulation itself is not becoming saturated.

### 4. SUMMARY

The probability of legionella contamination in ships' air conditioning systems is uncertain. However opportunities are available for this to occur. It is therefore recommended that such systems should be properly designed with this in view and thereafter regularly cleaned and maintained. The frequency of cleaning will depend on the arrangements in each system and its susceptibility to fouling but cleaning is recommended nevertheless at intervals of not more than 3 months.

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April 1998

[MC 025/006/0016]

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Environment, Transport and the Regions