

# **CIBSE TM40 GUIDANCE ON HEALTH AND WELLBEING AND THE CORONAVIRUS (COVID-19)**

## **Information Note**

Rev 1 – 3<sup>rd</sup> APRIL 2020

### **How relevant is CIBSE TM40 to viral infections, including the current pandemic?**

CIBSE TM40 Health and Wellbeing in Building Services was published in March 2020 (<http://www.cibse.org/tm40> ).

What is understood by « health » is very broad. CIBSE TM40 focuses on providing guidance for general situations and the general population (see scope and exclusions detailed in Chapter 1). It does NOT provide comprehensive guidance for environments such as healthcare buildings, for people with medical conditions, or for acute situations such as the current pandemic.

In addition, TM40 was produced before the current coronavirus pandemic. While it includes general guidance on microbial contamination, knowledge on how to address this particular virus is new and rapidly evolving. For a summary of current knowledge on the virus, including the most likely transmission routes, see REHVA reference at the end of this note. Specific guidance against this virus may therefore be developed in the future, both in areas which are covered here, such as air quality, and in other areas specific to this virus and its modes of transmission (e.g. public health engineering to reduce risks from the faecal-oral transmission route).

Some of the guidance in CIBSE TM40 is however relevant to the response to the pandemic in general buildings (not healthcare), in particular to the prevention and recovery stages of the pandemic (i.e. less so during the current, acute, stage of the pandemic).

The main chapter of relevance is Chapter 9 Air Quality, in particular:

- Section 9.4.5 Ventilation, including guidance on locating inlets away from sources of pollution such as exhausts, and limiting transmission risks by avoiding re-circulation and limiting mixing where possible. Reference is made to CIBSE Guides A and B for more detailed guidance where relevant. In the case of ventilation during an outbreak, however, REHVA guidance goes beyond TM40 as, for dilution and removal purposes, it is likely that higher ventilation rates will be beneficial: REHVA recommend to “supply as much outside air as reasonably possible” – see reference at the end of this note.
- Section 9.4.6 Filtration and Purification, particularly that addressing microbial contaminants. The most likely situation in ventilation systems with filtration is that filters will be aimed at fine particles (PM<sub>2.5</sub> and PM<sub>1</sub>), which are larger than virus particles. REHVA advises that contamination from the outdoor air would only occur in “very rare occasions”, for example if air intakes were close to exhausts. In that case some of the virus particles would still deposit on the filter, even if it is not an ultra-fine one. REHVA also advises that special UV cleaning equipment may be installed for the supply air or room air treatment to kill viruses, but that this is normally only suitable in healthcare facilities – this is in line with the advice of TM40.
- Section 9.4.9 Cleanliness of ventilation systems: designers’ responsibilities. This section primarily addresses cleaning after construction and prior to handover. Ductwork cleaning

at that stage is recommended for general cleanliness and air quality purposes. Whilst there is much that is not yet known about covid-19, early research published in the Lancet indicates that the primary transmission route is person to person<sup>1</sup>. The US Centres for Disease Control and Prevention guidance on disinfecting business premises in the event that someone is sick gives a lengthy list of things to be cleaned, but it does not include the ventilation or air-conditioning system. At this stage there is no published research to indicate that ventilation or air conditioning systems are contributing to the general spread of the virus, and REHVA advise that “viruses attached to small particles will not deposit easily in ventilation ducts and normally will be carried out by the air flow anyhow”. The above guidance on ventilation rates and on avoiding re-circulation should further limit the risk of room-to-room transmission through the ventilation system.

- Section 9.4.12 Operation and maintenance, with reference to the following sources for more detailed guidance: CIBSE Guide B2 (2016), CIBSE Guide M (2014), CIBSE TM26: Hygienic maintenance of office ventilation ductwork (2000), and BESA TR/19 (2019). Detailed ductwork maintenance requirements are set out in SFG20: Standard Maintenance Specification for Building Services (BESA, 2012). Given the closure of many business premises for the immediate future, there is unlikely to be a need to undertake work on their ventilation or air conditioning systems at this time. In normal operation airborne contaminants should be minimised by effective filtration, regular maintenance and where appropriate cleaning of ventilation systems, as set out in existing industry guidance.

Additional information of relevance can be found in Chapter 8 Humidity:

- Unfortunately, REHVA advise that control of the virus by humidity and temperature, which is possible for some viruses, would for this particular virus require high humidity levels and air temperatures ((above 80% and 30°C respectively) i.e. well above the ranges recommended by REHVA and TM40 for the purposes of thermal comfort and control of microbial growth. It is therefore not practical.
- REHVA recommend that very low humidity levels (below 10-20%) should be avoided as mucous membranes are more sensitive to infections in that range. This is in line with TM40, for the same reasons as well as for comfort (these levels tend to increase complaints of “dryness” and mild discomfort by occupants: see section 8.1.2).

Readers interested in how urban planning and spaces outside buildings can contribute to health and wellbeing may also wish to read Chapter 6, section 6.4, which includes some considerations and illustrations of how urban planning rules were often developed with health in mind, in particular to encourage air circulation. This section should only be seen as a starting point as it is not a topic explored in depth in TM40, and it is expected that knowledge and guidance will grow in the future.

**A note of caution:** New ideas, solutions and products will no doubt emerge in the coming weeks, months and years. Section 9.5.5 Emerging Themes – Solutions and Applications includes recommendations on how to approach and assess materials and technologies claiming particular benefits on air quality. It is essential that best practice is first adhered to, and that the precautionary principle is followed before applying measures which may have unintended consequences.

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<sup>1</sup> The current Public Health England guidance on infection control states that “The transmission of COVID-19 is thought to occur mainly through respiratory droplets generated by coughing and sneezing, and through contact with contaminated surfaces. The predominant modes of transmission are assumed to be droplet and contact.” (See section 2.1 of the PHE guide)

## **What CIBSE TM40 does NOT address, but which would form part of comprehensive strategies for preventing, preparing for, tackling, and recovering from a pandemic:**

- Healthcare environments
- Guidance for buildings hosting people with pre-existing conditions, such as lung conditions and other respiratory diseases
- Detection and monitoring of microbial contamination, including coronaviruses: this is on the basis that, generally speaking, there are no existing indoor air quality criteria for safe microbial exposure which CIBSE could refer to (WHO, 2009).
- Cleanliness protocols, hygiene procedures and occupant behaviours (e.g. hand washing, social distancing), beyond those related to building services operation and maintenance.

## **Next steps: what is CIBSE doing**

The knowledge on how to prevent, prepare for, combat and recover from such a pandemic is rapidly evolving. CIBSE are already involved in a number of initiatives with the aim to review our guidance and produce new or updated guidance where relevant. Topics of particular focus for CIBSE are expected to include:

- Better understanding of transmission routes, and therefore what should be the focus of prevention measures
- Ventilation, filtration and purification systems to prevent and tackle microbial contamination; for example, ventilation rates for effective removal or dilution; understanding of air paths, location of air inlets and ventilation design (natural or mechanical) to limit transmission from an infected person to other occupants, and from other sources such as exhausts<sup>2</sup>
- How to close down buildings in a “lockdown”: what needs to be done before buildings are left empty for potentially extended periods of time
- How to re-open buildings after a “lockdown”: how to check and ensure the environment is safe, how to safely carry out maintenance if the building and its systems may have been infected, and how to review operation and maintenance procedures and upgrade them where needed.

In many of these aspects, we expect that the specialist expertise of some of our members and academic partners in modelling the spread of infections within a building and/or its systems will be very relevant.

We will continue to communicate on this issue and highlight needs and opportunities for others to contribute to our work.

For additional information or if you would like to be involved in CIBSE's work on this topic, please contact the CIBSE technical team: Julie Godefroy [JGodefroy@cibse.org](mailto:JGodefroy@cibse.org) , or the CIBSE Healthcare group (see link below).

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<sup>2</sup> See for example research papers on the past SARS epidemic:  
[https://journals.sagepub.com/doi/abs/10.1177/1420326X10386669?casa\\_token=IQkt\\_icyJ4AAAAA:O17SW3HLC9FDT-QhC\\_q7-Uj3--DWAvpvD0f4Wt93Ou4dAGLje2c9fz3tdJfso4G83GHjWHLqh9mVEtk](https://journals.sagepub.com/doi/abs/10.1177/1420326X10386669?casa_token=IQkt_icyJ4AAAAA:O17SW3HLC9FDT-QhC_q7-Uj3--DWAvpvD0f4Wt93Ou4dAGLje2c9fz3tdJfso4G83GHjWHLqh9mVEtk) and  
<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1600-0668.2007.00500.x>

**For more information:**

- CIBSE TM40: [www.cibse.org/tm40](http://www.cibse.org/tm40)
- CIBSE Healthcare Group: <https://www.cibse.org/Networks/Groups/Healthcare>
- CIBSE webpage on coronavirus (covid-19): [https://www.cibse.org/Coronavirus-\(COVID-19\)](https://www.cibse.org/Coronavirus-(COVID-19))
- CIBSE Journal, “Preventing Covid-19 Spreading in Buildings”, April 2020
- Building Services Engineering, Research and Technology carries several papers of relevance to the current situation which publish research into transmission of the SARS coronavirus <https://journals.sagepub.com/home/BSE>
- REHVA COVID-19 guidance document guidance - How to operate and use building services in order to prevent the spread of the coronavirus disease (COVID-19) virus (SARS-CoV-2) in workplaces (live, will be updated as required): [www.rehva.eu/activities/covid-19-guidance](http://www.rehva.eu/activities/covid-19-guidance) . This guidance is also recommended by Public Health England NICC (National Incidents Coordination Centre).
- REFCOM Technical Bulletin TB / 048/2: Covid-19 And Air Conditioning Systems, March 2020 <https://www.refcom.org.uk/media/1441/technical-bulletin-tb-048-2-refcom.pdf>
- Construction Leadership Council guidance on site operating procedures during the current covid-19 pandemic: <http://www.constructionleadershipcouncil.co.uk/news/site-operating-procedures-during-covid-19/>
- UK Government guidance on construction sites during the current covid-19 pandemic: [https://www.gov.uk/guidance/remediation-and-covid-19-building-safety-update-27-march-2020?utm\\_source=471b6385-7328-4728-abf5-8a9a2ba9ba3b&utm\\_medium=email&utm\\_campaign=govuk-notifications&utm\\_content=immediate](https://www.gov.uk/guidance/remediation-and-covid-19-building-safety-update-27-march-2020?utm_source=471b6385-7328-4728-abf5-8a9a2ba9ba3b&utm_medium=email&utm_campaign=govuk-notifications&utm_content=immediate) ;  
At the time of publication of this note, the Scottish Government has taken a different view and has banned construction sites from remaining in operation.

*With thanks to Marcella Ucci from University College London and Sani Dimitroulopoulou from Public Health England for their input on this note.*